TREATISE

ON TREES

AND

SHRUBS

GROWN IN FRANCE AND IN THE COUNTRYSIDE

BY M. JAUME SAINT-HILAIRE;

PREFACED WITH A GUIDE TO GROWING TREES AND SHRUBS, BY
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ILLUSTRATED WITH FIGURES PRINTED IN COLOR AND RETOUCHED WITH BRUSHWORK

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[*Translator's Note*: The lengthy preface to this book was written by Andre Thouin, 1747-1824. Thouin was a distinguished French botanist and a pupil of Bernard de Jussieu. At age 17 he succeeded his father as chief gardener at the King's Garden in Paris (now the Jardin des Plantes) and enlarged it considerably. He became a member of the Academy of Sciences and of the Institut de France and professor and administrator of the Museum of Natural History in 1793. A street in Paris is named after him. His preface is dated August 18, 1824, barely two months before his death on October 27.

Thouin's introduction stresses the need for conservation and for the replacement of trees and woodlands to compensate for their destruction by the expanding population in France. It is a commentary on and a practical guide to planting and growing trees and shrubs. Though written in 1824, it seems remarkably contemporary in its concern for conservation and for the environment. It's notable that careful forest management already had begun in Europe long before it had in the United States.]

A GUIDE

TO THE SOWING, PLANTING, AND CULTIVATION OF TREES

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GENERAL CONSIDERATIONS.

In countries with a small population, the growth of woodlands occurs naturally and is sufficient for society's needs. This is still the case in Russia, in America, and in several Oceanic islands. It was also true in Gaul at the time of Julius Caesar's conquest. He found wood suitable for construction in the Marseille region, and as his army advanced, impenetrable forests where Druids worshipped peacefully and which provided a secure refuge for those who sought to evade the conqueror's yoke. But this has not been the case for a long time. The many generations that followed consumed wood to such an extent that impenetrable forests no longer are found in France, and the vicinity of Marseille offers nothing more than stones and dry sand.

Natural growth has been inadequate for a long time. There have been attempts to make up for it by sowing and planting, but today it seems quite certain that the supply of

usable wood, particularly that produced by our forests or by cultivation, no longer provides for the daily needs of our population. It is urgent that the authorities remedy this situation, or soon we will be obliged, as are the English, to get our supplies from abroad. While waiting for promises made long ago by well-meaning individuals to materialize, we believe that it is now in the best interest of landowners to plant woodlands and to propagate good varieties of oaks, elms, beeches, maples, etc., both domestic and foreign. And to realize as well that the constantly increasing price of usable wood offers those not influenced by misguided selfishness, nor hurried by their needs of the moment, an opportunity to undertake the most advantageous cultivation possible. Woodlands appear in many dry areas that are of little value for other plants; at the same time they are a lovely embellishment to country estates. Their foliage cools the air during the heat of summer and covers the ground with fertilizing material at the approach of winter. Countries with tall timber forests are less vulnerable than are others to blasts of the north wind. It's an established fact that the tops of large trees attract clouds which, as they turn to rain, water the countryside and create and feed its springs and streams.

PROPAGATION OF TREES.

Trees and shrubs are propagated by planting seeds, and by root suckers, layering, and cuttings. Wherever possible, the first method is the safest and most advantageous.

Seeds of trees destined to create forests especially need to be sown on location. As a result, timber trees become more securely rooted in the ground, more beautiful, and more vigorous; the trees are healthier for it, they live longer, and their wood is of the best quality. All of these benefits derive from the fact that trees sown in one spot retain their taproot. It penetrates deeply into the soil, supports the tree against the force of the wind, and gathers nourishment from afar that it then restores in greater measure to the entire plant economy, bringing it health and vigor.

Trees that have begun their life in a particular soil are better adapted to it than are those transplanted from nurseries for yet another reason. This is the natural way that large plants reproduce. Seeds dispersed by the wind, distributed by birds, or water-borne, will germinate when the conditions are right. Their taproots push down deeply and their tops reach to the sky. By copying nature's ways, we can hope to achieve the level of perfection that we're capable of.

SEED PLANTING.

Tree seeds are planted 1) by scattering, 2) in furrows, and 3) one by one. Before planting, one must make certain that the seeds are of good quality. This can be done by obtaining seeds in season from trees that have achieved their maximum strength. Seeds that are full, heavy, intact, quite clean, that don't smell of mildew or are rancid, nor show evidence of insect damage, should be considered good and usually are the best.

Soaking, an acclaimed touchstone, is of doubtful value. Seeds already depleted of reproductive energy won't do any better under water.

Many seeds whose germ is enclosed in a hard capsule, like those of the Rubiaceae, lose their ability to germinate shortly after they ripen. Others that contain natural oils that spoil readily and react with the germ, such as those in the laurel and myrtle family, have a similar problem. There are still others like buckthorns whose seeds are very hard and that further harden while drying, so that if one waits until spring to plant them, their germination will be delayed for a whole year. These difficulties can be overcome by planting or stratifying such seeds immediately after they are fully ripe.

STRATIFICATION.

Stratification consists of placing the seeds one wishes to preserve in sand or in earth beds within containers. The earth or the sand in this case should not be too dry nor too moist. If too dry, it will absorb moisture from the seeds; if too moist, the seeds will rot or germinate at an inopportune time for the growth of the young plant. Stratification is performed shortly after the seeds ripen; the containers holding them should be sheltered from rain and hard frosts. At the onset of spring, the seeds are removed from their containers and placed in the ground.

SEED SCATTERING.

After the last hard frost, when the ground becomes workable during the rainy season, is the time to plant most seeds for trees in open country. To scatter the seeds, a prudent person carries the seeds he wishes to sow in a tray fastened at the hip and will cover the field he is sowing at a regular pace. With each step, he takes a handful of seeds and distributes them as uniformly as possible over a specified area. If the seeds are too fine to hold in his hand, he can mix them with dry soil or sand and distribute the mixture together. Sowers (machines that can distribute seeds very uniformly) have been invented; but they're not used either because they don't fully accomplish their purpose, are too expensive, or because custom resists it. [*Translator's note*: The Industrial Revolution came later to France than it did to Britain. At the time this book was published, there still may have been considerable opposition to the use of machinery in French agriculture.]

SOWING IN FURROWS.

Sowing *in furrows* is widely used for trees in nurseries. It consists of laying out a furrow in a recently worked field - its width and depth depends on the kind of seeds one intends to plant in it - distributing the seeds in it as uniformly as possible, and covering them with fine soil at a suitable depth. The soil at the bottom of the furrow is then firmed with the back of a rake and covered with leaf mold or other fertilizer as the situation requires.

This method has the advantage that it keeps the seeds fresher, and that it subsequently provides earth for the saplings while they need it during their growth. Earth banked up next to furrows is steeply sloped; it slides down readily, and ensuing rainfalls soak it and progressively wash it to the bottom of the furrows.

PLANTING SEEDS ONE-BY-ONE.

Large seeds, such as those of oaks, chestnuts, walnuts, horse-chestnuts, almonds, peaches, and others like them that have been stratified since the autumn and that are germinating or about to do so, are planted one-by-one in rows a fixed distance apart. If the trees from these seeds are to grow permanently in the same location, the seeds are planted with the radicle intact. The trees will become larger and prettier, and they are less susceptible to being uprooted by the wind. But if the saplings are to be transplanted, it's best to clip the end of the radicle with a fingernail, so that the taproot, instead of growing straight down, will branch out and divide into several roots that spread out at ground level. The trees thus will be more certain to take root again when transplanted.

This method is used for planting small groves of oaks, beeches, and chestnuts. In country gardens it's also used to plant sturdy wild stocks among trees on an espalier for later grafting of the desired species when they begin to show signs of withering.

Since several species of seeds don't germinate either in the first or in the second year, one never should be in a hurry to change a seed planting.

ROOT SUCKERS.

Root suckers are long roots that run several inches underground and emerge to give rise to shoots that form new plants. Suckers are separated from the parent root when they have enough root hair to ensure that they will take root on their own. For deciduous trees, the best time for this is when they are at rest, namely at the end of autumn and at the beginning of spring. For evergreens, the safest time for separating suckers is when the sap is rising, either in spring or in autumn. The planting of suckers differs little from that of seedlings; they are put in open ground in the same way. But note that trees derived from suckers don't grow as high or have as pretty a shape and are less vigorous than those grown from seeds.

There are several ways to propagate trees from roots - here's the easiest and safest: The roots are severed from the tree, but instead of removing them, they are left in place in the ground. The cut end can simply be lifted up and pulled out of the ground an inch or two. The roots, which have not been moved, are equipped with many passages for nutrients. They will transport sap to the part of the root above the ground, form a protrusion at that point, and will soon put out new shoots. The young trees are lifted the following year, completing the propagation.

LAYERS.

[*Translator's note*: Two kinds of layering are described. The first is the easier method of earthing up a cluster of stems or of shoots growing from a tree stump and allowing the branches to grow roots. The second method is the more familiar one of bending branches down to the ground so that they take root.]

Layering means inducing attached branches to grow roots by manipulation and special cultivation. When the roots are sufficient to nourish the layered branches, the branches are severed and they will form new trees.

The purpose is to propagate certain woody plants that don't retain their useful or pleasant qualities when grown from seeds, those that never produce good seeds, and lastly those that take much longer to bring pleasure when grown from seeds than from layers.

The entire rationale for this procedure is to make the layered branches grow roots and produce new trees endowed with all the qualities of their parent stock, by means of moisture, temperature, proper soil, incisions, or ligatures.

It's based on many experiments proving that branches of woody plants can grow roots and, similarly, that roots can give rise to branches.

Trees and shrubs differ in the ease or difficulty with which they can be propagated from layers, which requires growers to use various methods and a variety of techniques.

The easiest way to layer is to heap up a mound of earth around a cluster of stems of trees or shrubs planted in open ground.

To make such a mound, rather thick muddy earth is used that will readily take up moisture and retain it for a long time. The mound should be pyramid-shaped with a twenty to twenty-four inch base and approximately the same height. It is pressed around the young branches, and the surface is firmed up so that it is less likely to crack and will keep fresh longer.

If the layerings need looser soil and more moisture, and if one is counting a lot on their success, a bottomless box of four boards, twenty inches long by eight to ten inches wide, is placed around the cluster. It's filled with suitable soil, covered with a two-inch thick layer of moss, and watered as needed.

The end of winter, when the ground is thoroughly wet, is the most appropriate season for this kind of layering. No further steps are required. No additional care is needed other than occasional watering during the hottest parts of the summer. In the autumn, it's a good idea to verify that the buried branches have grown sufficient roots so that they can be separated from the stock. If the root ball is substantial, the layers are cut and set in place. If the roots aren't sufficient to nourish the new shrubs, one must wait until the next year to separate them from the parent stock.

Propagation by layering also is used for some trees and shrubs whose stems are harder than those described above; but these need an additional step in order to grow roots.

It consists of bending the branches down into the ground instead of leaving them upright and heaping them up with earth, as in the layering method above.

This method is used to fill in clearings in copsewoods that are not too large; it's one of the easiest and least costly ways to accomplish this important objective. If there are trees with young, flexible, and vigorous branches located at the edge of or inside a clearing, small trenches about ten inches wide and a foot deep, and long enough to accommodate the branches, are dug in the ground. The branches are then carefully bent so as not to break them off of their stocks. They are laid down in these small trenches. Their upper ends should be straight and extend about six inches out of the ground. About half an inch should be clipped from the top of the branch to stop the flow of sap and to get it to generate roots. The laid-down branches should be embedded in grass, leaf mulch, and topsoil, and the rest of the trench refilled with the original soil. The soil is compressed to firm it up around the branches and to retain moisture favorable for root development. Vertical branches must not be left in a cluster where most of the other branches have been laid down. Sap from the main stock has a strong tendency to rise straight up, rather than to circulate into bent-over branches; it will fail to go into them and instead will flow mainly into the vertical ones, and the layers will be lost. So it's essential to get rid of the vertical branches.

To keep new ones from growing up before the layers have taken root, it's best to cover the cluster with a four or five inch mound of earth. However, this does not apply to weaker shrubs that often die when all their branches are covered.

Layers like these often require two years, sometimes more, to take root. When they do, they are separated from their clusters. The earth that had covered the clusters is removed, and the clusters will waste no time generating healthy branches to replace the ones that had been layered.

Once again, this method is a good one for filling in clearings of approximately twenty square yards. It's better than planting new trees. The latter would only deteriorate in a confined space where the roots of nearby trees have already taken hold. Layers get the nourishment they need from the roots of their own stock, and they are much better protected while they are young from depredation by nearby trees. But if there are large clearings that need to be filled in, layering takes too long and is often inadequate; one has to resort to seed planting.

Trees for nurseries are also propagated by layering. Here's how to do it: The parent stocks are set in an area especially designed for the purpose. Stocks, whose main stems or largest shoots have been cut off at ground level, make sturdy bases for trees and shrubs. When the stocks have grown a lot of young vigorous shoots two to three feet high, they are laid down eight to ten inches deep into the ground all the way around the parent stock.

The stock itself is covered with a conical mound of earth six inches high, and arranged so that rainwater flows over it and collects in the trenches around it. For this purpose, a circular rim of earth is formed against which the ends of the laid-down branches are arranged. For small trees and shrubs, the ends are nipped off to stop the sap and to promote more timely growth of the roots. They will grow enough to live on their own during the course of the year, and they can be lifted the following autumn and put in a nursery.

PLANTING.

[*Translator's note*: This last long section calls to mind the long rows of planted trees that were in vogue in the 18th and 19th centuries and still are seen in the formal parks and gardens of France.]

When the above methods of propagation can't be used due to special circumstances, one can turn to saplings. Those with the longest, healthiest, and liveliest roots must be selected, and they are not to be trimmed as severely as usual. Care must be taken that the roots are not bruised, scraped, or torn, which happens all too often. They are to be protected from exposure to air, and especially from frost, from the moment they are lifted until they are re-planted.

The stems of the saplings, however, have to be cut close to the ground, sometimes repeatedly, so it is of little importance that they be healthy and vigorous.

Having chosen the right kind of tree for the location and prepared the soil, one proceeds with the planting. A light plough on a base, minus ploughshare and mold board

and guided by marker staves, traces longitudinal lines, while others, crossing at right-angles, lay out the transversals. Each intersection marks the spot where a tree will be planted. Workers prepare the ditches, more or less deep, depending on the type of soil and the saplings. Next, planters line up along sections of the lines, place the tree roots at the intersections, and plant them there. The distances between the trees depend on their nature, the terrain where they will be, and the purpose of the planting. If one intends to plant a copsewood in mediocre soil the saplings are set five feet apart. If, on the other hand, the soil is rich and deep, they are placed six feet apart. If the plan is to grow trees to be harvested for timber, individual trees are planted five feet apart. About the tenth or fifteenth year, when the trees start to obstruct each other, every other one is cut in each direction. The trees are then ten feet apart. About the twenty-fifth or thirtieth year, each intermediate tree is again cut down, and the remaining trees are then twenty feet apart. They can continue that way until the timber is harvested.

It's a pity that foreign trees are hardly used for planting forests. Yet several hundred different kinds have come to France and already are well adapted here. They could be used successfully to replenish areas that have been abandoned as unproductive. [*Translator's note*: in the 17th and 18th centuries, French explorers and botanists pioneered the introduction of trees and plants from distant lands into Europe. Thouin himself acclimatized many new varieties for growth in France.]

Saplings are also planted on location for hedgerows, palisades, and groves.

Lifting them doesn't require the same care as for saplings intended for timber. They are usually chosen from saplings two, three, or four years old. The trees include hawthorns, thorny plums, small elms for hedges, hornbeams, common maples, privets, and the like. The ones for hedgerows are planted in small ditches dug to a shovel's depth. The sapling's taproot is cut off and the stem is cut down to three to six inches above the ground. The individual saplings are placed next to one another, three to five inches apart, arranged in a single line.

Saplings for palisades in gardens are planted closer together. They are cut back to a height of fifteen to twenty inches, or even higher if one wants to enjoy them sooner, and if they're strong and in good ground. They are also planted by lines in ditches between three and seven inches apart.

Groves are created in gardens with all kinds of trees, shrubs, and bushes. The way they now are planted in Paris and its surroundings is truly a disaster. It's costly, offers only brief enjoyment, and is regretted afterwards. Different species of trees of the same age are crowded together pell-mell; some will grow into large trees, while others remain mere bushes. And they're all placed less than four feet apart!

For the first two or three years, these trees live well together;

the grove is full, and it looks fine. But soon the more vigorous trees take over and choke the others. The planting continues to deteriorate and the pleasure of it is lost. To create plantings of this kind that are pleasant and that provide lasting enjoyment, saplings of big trees should be planted fifteen or twenty feet apart from one another, small trees from eight to ten feet, and shrubs about three feet apart. Furthermore, the largest ones must be placed in the interior of the grove, and the smaller ones graded toward the edges. If one wishes to fill out the space early in the planting, clumps of lilacs, privets, or other shrubs that don't mind a lot of shade may be planted at wide intervals. It's easy to do, not much trouble, and one can enjoy them for several years without losing them.

When only one kind of tree is planted in a wooded grove, the trees can be planted close together, about eighteen to twenty inches apart. The problem described above doesn't arise because the saplings are the same age, they are present under the same conditions, and grow the same way. But plantings of this kind offer no special beauty, and if you've seen one tree in the grove, you've seen them all. Variety, the main feature that captures the eye, the very "soul" of a garden, is lost to one's enjoyment. But such uniform groves are allowed even in tasteful gardens. They're the ones that will hold the earth on steep slopes and cover it with greenery. Privets, small elms, boxthorns,

and others like them are used for this purpose. Saplings of these small trees can be planted six inches apart from one another and cut to an inch above the ground. When trimmed as closely as possible each year, they will accomplish the goal perfectly. Several such groves can be seen at the Paris botanical garden. One, planted with small elms fifteen years ago, densely covers a steep slope exposed to the broiling sun, where no lawn could have survived.

Saplings to be planted in nurseries need to be treated a bit differently from other trees. Since they only need to stay there until they are strong enough to be permanently transplanted, they are set in rows in patches or square beds according to the needs or type of the tree.

Saplings of large trees intended to form avenues, to border highways, to form quincunxes, and to create groves, can be set in rows and spaced fifteen to thirty inches apart, keeping in mind that they will have to stay in a nursery for a while, and especially in a spot where they can be lifted without damaging the roots of other trees.

Bushes and shrubs are also planted in rows, but in a bed about five feet wide separated by paths fifteen inches wide. Depending on their strength and the time that the saplings need to stay in the nursery, they are spaced in a line from six to fifteen inches apart from one another.

It's customary to cut off the taproots of seedlings to be placed in nurseries and to trim their lateral roots. This practice poses no threat to their safety or to their taking root

afterward, provided it's done moderately. It's even beneficial for the successful growth of the young trees after planting. The severed taproot is replaced by branching roots that tend to go deep into the ground, but they don't have the strength of a taproot and they take a different course. Lateral roots that have been trimmed bifurcate, branch out, and generate lots of root hair. All these roots and root hair increase the number of passages for nutrients for the young tree and make it grow more vigorously. A second advantage is no less important when the time comes to lift the sapling from the nursery and transplant it to its destination. Equipped with a lot of roots and root hair, it lifts up better and is more certain to take root again than a tree whose roots haven't been treated this way. Generally, the tops of saplings of large trees ought not to be cut when planting them in a nursery, but rather left at full length. Only the lateral branches should be pruned to reduce the load on the young tree and to lessen the likelihood of it being caught by the wind.

Small trees, shrubs, and bushes without defined trunks can be trimmed and their stems cut back in proportion to the quantity, and especially the condition, of their of roots. If the roots are fresh and plentiful, and if planting is done at the right time, the stems are pruned long. If, on the other hand, the roots are sparse because they've dwindled and the season is well along, the stems should be pruned quite short, about four to five inches above the ground.

The end of autumn is the best season for saplings of large trees from nurseries to take root in friable soil and in warm climates. Planting at the end of winter is more appropriate in hard or in wet soil and in northern climates. Nonetheless, the timing will vary with the kind of tree, the amount of moisture in the soil, and with a number of other local conditions. More precisely, such trees can be planted after they've shed their leaves and up until the time that new buds are just developing and leafing out. The right soil for this type of planting can't be specified; it has to vary with the type of tree to be planted in it. As a rule, it ought to be loose, penetrable by roots, free of large stones, and at least three or four feet deep. It must be protected from domestic animals and particularly from wild animals that can irreparably damage the young trees.

Several species of trees that already have had their taproots cut off when moved from the seed bed to a nursery no longer need to undergo the same operation on their roots when they’re lifted for permanent planting. If the trees have been lifted carefully, with their roots intact, it’s enough just to trim the ends. But often the haste and clumsiness with which they are pulled up requires two further operations that spoil both the trees' health and the planters' enjoyment of them. The first is *dressing* the roots; i.e. cutting back to where

the sap flows those roots that had been split, torn, or bruised when the tree was lifted. If, to correct a flaw, a root had to be pruned on one side of the tree, then, in the interest of symmetry, roots of the same length on the opposite side also must be pruned, even though it's harmful to the tree. In the end, roots excessively shortened this way don't extend enough to hold the tree in place. Above all, they are insufficient to provide necessary nourishment, and the tree itself must be cut back. This second operation, an inevitable consequence of the first, is no less disastrous. The branches are cut to the same extent that the roots were; and sometimes not even one is left. And that’s not all. Those who are not content just to get rid of branches often even top the trees. This perverse principle is so widely accepted among so many growers that it's become a maxim that "if a gardener were to plant his father, he would have to cut off his head and feet". Even though the results are different, they are no less injurious to plants that have been submitted to this cruel operation.

A topped tree whose roots have been shortened grows more vigorously than one planted with its top during the first years after planting; but it almost always contracts a disease that shortens its life, decreases the value of its wood, and distorts its appearance. The disease, usually called *la goutière*, is a form of decay that decomposes the heart of the wood. It's caused by rainwater penetrating through cracks that inevitably form in the scar left behind after topping the tree.

The water is not drained off by sap vessels. It gets into the pith of the tree and rots it. The decayed pith eats away the layers of wood around it, and with time the whole inside of the tree rots. The disease progresses much more quickly in trees that are regularly topped, such as elms, ash trees, oaks, mulberries, and especially willows. It happens equally to trees that have been topped only once, except for those planted very young. To remedy this very serious problem, and so that proponents of this type of planting can't get away with it unnoticed, they should take care to trim the scar almost perpendicular to the horizontal, at an angle of at least sixty to seventy degrees. Furthermore, the cut is made to face north so that it is less exposed to the sun. Lastly, some cover the cut with *unguent of Saint-Fiacre* or with a compound of wax and pitch called *plaster of W. Forsyth*. What an effort to cover up a bad job, and often without getting the desired result! Why not do it in a simpler and more natural way, where experience has yielded more satisfying results? All the trees planted for the last thirty years in the Garden of the Museum of Natural History in Paris, some twenty five thousand, and more than three hundred species and varieties, both domestic and foreign, were planted with their tops and with as many roots as possible. The method is quite simple and it is based on physical principles. At the outset, the trees in the nurseries were dug up carefully.

The roots were lifted out cautiously so as not to split, tear, or bruise them. They were taken at their full length; the trees were transported right after digging them up, with the necessary care to avoid cramming them into the carts that carry them and bruising or breaking their roots. Upon arrival, they were planted after gently trimming the ends of broken roots. The whole live root-ball had been saved or merely trimmed at the edges. The tops of the trees were scrupulously preserved, pruning only the side branches. To relieve the roots of the burden and difficulty in supplying sap, and to protect them from too much wind, holes and trenches had been opened up well in advance so that the soil was properly prepared by exposure to the air, rain, and sun. Lastly, when planted, the roots were placed in their natural position, covered with loose soil carefully filled in to leave no empty spaces between them, attached with lead to hold them down well, and finally watered as needed. This is the way the trees along the great avenues in the new area of this garden were planted. Even though at that time the trees had trunks six to eight inches in diameter and were more than eighteen feet high, not a single one has died. Fifteen years after they were planted they have grown most beautifully and are in the best of health. This procedure is without a doubt more expensive than the usual one; there are increased costs for lifting,

transport, and above all for making longitudinal trenches instead of holes. But the usual method actually turns out to be even more costly, if one takes into account the large number of trees that have to be replaced during the first three or four years after planting. Furthermore, what a loss to have to delay the outcome and to miss out on enjoying it! So, all things considered, there is pleasure and profit in planting at a price, loss and distress in planting cheaply.

Trees lined up in rows are planted ten to thirty feet apart from one another, depending on their nature. The largest, those that grow sixty to one hundred and twenty feet high, can be planted thirty feet apart; medium sized trees that grow thirty to sixty feet need twenty feet between them. Lastly, small trees that rise fifteen to thirty feet are planted ten feet apart.

It's well known, needless to say, that the type of ground and the kinds of trees will make a difference in these distances - they should serve only as approximations. The type of soil appropriate for trees in rows also must vary with the trees' ability to grow in it and with their preference for certain soils over others. In general, trees can be divided into three large groups: those of mountains, plains, and swamps. Those are the keys that indicate the right location for them; observation and experience determine the rest. If the saplings must be planted before winter in dry terrain and in a warm climate,

the above precautions are especially necessary for trees that are to be planted in rows. In northern countries, it's only in cases where water flows in or the soil is submerged that this could be harmful.

Planting resinous trees presents some notable differences that deserve attention.

Firstly, pruning of any sort is harmful and should be carefully avoided; neither roots nor branches ought to be cut, and the tops of these trees especially must be spared. The time to plant them is not the same as that for other trees. The latter are planted during winter when the sap is resting and the trees are inactive. Resinous trees on the contrary need to be at the beginning of active growth to be transplanted successfully.

Resinous trees are planted at two different periods of the year: while they are active both in autumn and in spring. The best time is when they've already put out terminal buds about an inch long. They are lifted together with clods of earth as much as possible. If the planting site is more than a day's travel by road from the nursery, the trees are first planted in small wicker baskets that are put in the ground with them at their destination.

It's appropriate to lift them from the nursery with all their roots. If some of the roots don't have earth on them, instead of cutting them off, they should be carefully preserved and laid out in their original positions during planting.

Transplanted trees should not be too old nor too large. They will do well only if they're not past their fifth year and they're not more than ten feet high. As soon as they are

permanently planted, it's useful to fasten the trunks to strong props to prevent them from being shaken by the wind. Without this precaution, many trees would be lost because the motion caused by the wind can break growing roots and this repeated disruption can kill the trees.

Resinous trees also can be planted with bare roots without earth on them, but as very young seedlings to be put in a nursery. In this case it is essential to keep their roots at full length and to shelter them carefully from contact with air. They're normally wrapped in fresh moss, which does the job perfectly. If the roots were left exposed to air, they would soon lose all their moisture, and they would become dry and brittle. In comparison with deciduous trees, resinous trees are more difficult to transplant. This has led to planting them in pots and bending the taproot around, which is usually pretty long, to avoid having to cut it off. The pots are then buried in a bed facing north and they can be changed as the trees become stronger. This procedure is still used for rare and delicate species. It's worthwhile following, and it completely accomplishes its purpose.

When evergreens four or five feet high are transported a long way, and it would be too costly to move them in earth, a little-known method is used that works perfectly. Before lifting the trees from the nursery,

muddy soil, cow dung, and water are mixed in a tub and made into a pulp that is not too runny nor too thick. As lifting proceeds, the roots are soaked in the mixture right up to their base. They are left to dry a little in the air so that the blend adheres to them well, after which they are soaked a second time in the same mix, left to dry again, and soaked afresh. By virtue of these three successive immersions, a thick crust of the blend forms both on the roots and on the root hair. It protects them from the air and keeps them fresh and in good condition. When the trees are planted, the mixture washes off in the fresh soil and supplies the young roots with a nutritious humus that makes no small contribution to their taking hold again and to their vigor. Thirteen coastal pine trees prepared this way traveled for eleven days and were planted on the hill of the Museum's garden. They are still vigorous thirty years later.

This method ought to be used for many delicate trees that have a hard time taking root again; it can't help but be effective.

The distance apart that the trees are planted, their aspect, their proper site, and the type of soil vary with different species. Some like clayey and wet ground; others prefer sandy and dry soil. Some live on high mountains, and yet others in muddy swamps. Their sizes range all the way from a bush to the tallest tree. You'll find the necessary information for growing each one of them in this book.

For large-scale cultivation of resinous trees, it's by all accounts more advantageous to sow them as seeds, rather than to transplant them.

Non-resinous evergreens like holly, laurel, *phillyrea*, alatern, etc. also have a hard time taking root after transplanting. For this reason they're almost all grown in pots, and the roots are planted with the earth on them. Trees raised this way can be planted all year, except during frost. If they've grown up in open country, they should be lifted with earth on them, planted in wicker baskets, and allowed to take root in a shady spot. After it's certain that they've rooted again, they're planted at their final location. The most favorable season for planting evergreens in baskets is mid-spring, when the sap begins to rise. If they're transplanted before or after this period, the young trees remain inactive for a long time and a large number often perish. The less their roots and branches are cut, the better. For the trees to grow successfully, it's advantageous to avoid planting them when they're too old; it's hard for aging trees to take root again. Ordinarily, one chooses healthy trees six to eight years old and four to six feet tall, with trunks not more than three inches in diameter at the base. But this rule has exceptions. Trees like the holly take root best when they're about the size of one's lower leg, but this is most unusual.

Lastly, some evergreens, despite all the care taken during transplanting, will still only take root with difficulty, perhaps only one in ten. It's preferable to sow seeds for these kinds of trees at their permanent location. To be on the safe side, one could stratify the seeds and plant only those that have germinated well.

Paris, August 18, 1824.

A. THOUIN,

Professor at the King's Garden.

APRICOT.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, MONOGYNY.

The cultivated apricot tree, *Armeniaca vulgaris*, LAM., *Prunus armeniaca* L., has been grown in France for ages for its delicious fruit. Its trunk grows fifteen or twenty feet high and is covered by brown bark. Its branches spread out into a large mass. The leaves, almost heart-shaped, are smooth with dentate margins. The flowers appear before the leaves. They are white, sessile, single or two-by-two in clusters and emerge from scaly buds. The calyx is monophyllous in five sections. The corolla has five petals. A large number of stamens insert into the calyx. The superior ovary culminates in a style and stigma; it becomes a round fruit with a groove on one side. The fruit is covered with short fuzz; it contains a smooth, round, compressed pit edged on its sides with two ridges, one blunt, the other sharp. The pit contains one, sometimes two kernels.

FLOWERS: February and March.

RANGE: thought to have originated in Armenia. [*Translator's note*: the apricot now is known to have originated in China and was introduced into Europe via Armenia.]

NOMENCLATURE. Apricot comes from the Arab word *barqoq*. *Armeniaca* means originating in Armenia. German, *aprikosenbaum*. English, *apricot-tree*. Italian, *albicocco*. Russian and Polish, *morela*. Bohemian, *morunka*. Hungarian, *tengeri baratzh*.

USES. The wood of the apricot tree is veined red and yellow. It's sometimes used in lathe work. The fruit is soothing; it's eaten raw, preserved in liqueur, or made into pies and apricot marmalade. The seeds, sweet in flavor, can be used the same

way that almonds are: they are crushed together with the pits in a liqueur. After a long infusion, one gets a ratafia or an *eau-de-noyau*.

CULTIVATION. Several varieties of apricot are cultivated, but the Nancy apricot and the clingstone are preferred; their flesh is juicy, fragrant, and very tasty. A few years ago a new apricot, called *royal apricot* by M. Hervy, was obtained by the nurseries of the Luxembourg garden. It's as good or better than the two preceding varieties.

Apricot trees like warmth, so in the north of France they should be planted facing south. Their fruit will improve to the extent that the tree gets sunshine, whether left in the open or grown next to a wall.

The apricot tree is propagated by planting the pits in the ground as soon as they separate from the pulp. It can also be grafted on a plum tree. Since the tree blooms early, one must take care in the north of France to protect its flowers from early frost by keeping it covered with straw matting from six in the evening until nine in the morning.

KEY TO PLATE.

1. Flowering branch. 2. Branch with leaves and fruit. 3. Open calyx, stamens and pistil. 4. Pit. 5. Kernel. [*Note*: The original numbering in the key to this plate has been corrected by the translator.]

ACACIA.

Family: LEGUMINOSAE
Reproductive system: MONADELPHOUS, POLYANDRY

The silk tree acacia, *Mimosa julibrissin*, SCOP. [*Translator's note*: now designated *Albizzia julibrissin* Duraz.] is quite a large tree grown widely in parks and gardens. Its trunk, fifty to sixty feet high, supports a broad, flattened crown. The leaves are large, two- or three-fold bipinnately compound, composed of twelve or fifteen pairs of small leaflets that are narrow and close together. They are green and smooth with entire margins. The flowers form reddish or yellow flower heads and create a very pretty sight. They have a monophyllous five-pointed calyx, an infundibuliform corolla, also five-pointed, and a large number of red stamens gathered at their bases like tassels of silk. The ovary is superior. It converts to a leguminous fruit several inches long containing small round seeds.

FLOWERS: August and September.

RANGE: The Levant.

USES. This tree should be propagated in parks and gardens everywhere. Its foliage is most elegant, and during the flowering season it's at its best. There is one in the school of the King's Garden in Paris; it blooms every year, and it is not at all harmed by cold weather. [*Translator's note*: the "school" (*école*) occupies a central part of the King's Garden (now the Jardin des Plantes). It is used for teaching botany and is planted with special trees for study and research.]

Livestock definitely will eat the leaves. The acacia in the botanical garden in Grenoble blooms and bears fruit.

CULTIVATION. This tree is propagated in springtime by seeding in a manure bed. In northern France it must be placed in loose soil and kept sheltered from the east wind.

Anywhere else it won't do well and will be lost by the second or third year.

KEY TO PLATE.

1. Complete flower, enlarged. 2. Stamens and pistil. 3. Individual stamen, enlarged.

ACACIA

Family: LEGUMINOSAE.
Reproductive system: POLYGAMOUS, MONOECIOUS.

The sweet acacia, *Mimosa farnesiana*, LINN., originally comes from southern America. [*Translator's note*: also called *huisache* in Central America where it originated; it is now designated *Acacia farnesiana* Willd.] It has been acclimatized for several centuries in Provence, especially in gardens in the Grasse district. Its elegant foliage and the pleasant fragrance of its flowers have made the tree valuable and useful. Its trunk grows to a height of twelve or fifteen feet. It has pairs of thorns at the bases of the petioles. The leaves are two-fold bipinnately compound, consisting of sixteen to eighteen small leaflets. The flowers are yellow; they form globular heads and are sessile, frequently on axillary peduncles. The calyx is tubular, with five indentations at the top. The corolla is monopetalous, with five divisions. The stamens are very numerous and are much longer than the corolla. The ovary is superior, culminating in a style and stigma; it develops into a curved, brown cylindrical pod.

FLOWERS: around the end of summer.

RANGE: the island of Santo Domingo, [*Translator's note:* Hispaniola, (now Haiti and the Dominican Republic)] and Guiana.

NOMENCLATURE. The name *mimosa*, which in Greek means a mime or a comedian, was given to plants of this kind because of the movements they seem to undergo at sunrise and at sunset, as well as under many other circumstances. German, *die Farnesische acacie*. English, *the sweetscenter mimosa* or *sponge-tree*. Spanish, *aronco*. Portuguese, *esponja*.

USES. The flowers make an excellent product for the perfume industry. They impart a pleasant odor to fabrics that keeps moth larvae away. In warm climates, the tree can be used to enclose gardens and dwellings;

it is protected by thorns that form an impenetrable thicket. The wood is white and very hard. [*Translator's note*: uses for acacia wood date from biblical times. It is mentioned frequently in connection with the construction of the sanctuary (*Exodus 25-27 and 36-38*).]

CULTIVATION. The tree is propagated from seeds obtained from Provence and sown in a manure bed. In northern France, it needs to be kept in a temperate greenhouse during the winter, but it can be put outside in summer.

KEY TO PLATE.

1. Sweet acacia. 2. Corolla and stamens (enlarged). 3. Calyx and pistil.

BILBERRY

Family: ERICACEAE
Reproductive system: OCTANDRY, MONOGYNY

The bilberry, *Vaccinium myrtillus*, LINN. [*Translator's note*: also called whortleberry; the familiar cranberry in the U.S. belongs to the same genus.], is a small bush native to our region. The stems, about a foot high, are smooth, crooked, and covered with branches. Leaves are ovate with slightly dentate margins. The bell-shaped pendent flowers, pinkish white, are solitary in the leaf axils. The calyx is adnate and entire. The corolla is narrowed at the top with five indentations. Eight stamens, inserted into the receptacle, terminate in pointed anthers. The fruit is an umbilicate round berry, with four or five compartments that contain many seeds.

FLOWERS: in April and May.

RANGE: France and a large part of Europe.

NOMENCLATURE: *Vaccinium* was the name given by the ancients to a bush with black fruit that seems to have been the same as our bilberry. *Myrtillus* is the diminutive of *myrtus*, the myrtle, that our bush resembles in shape and foliage. German, *heidelbeere*, *heidel*. Danish, *blaaebar boller*. English, *blea-berry*. Spanish, *arandano*. Russian, *tscherniza*. Polish, *czernice*. Bohemian, *cucoritka*. Colloquial French, *le mauret, la brimbelle, le raisin des bois, le bluet, la cousine, les macerets*.

USES. The bilberry's fruit is red to begin with but turns blackish-blue at maturity. Children and shepherds enjoy eating them. They are served with milk and

cream, made into tarts and into dried preserves that keep for several years. Some wine merchants use the juice to color white wines; it imparts a very pretty violet color.

Virgil is thought to have had this bush in mind when in his second Eclogue he said:

Alba ligustra cadunt, vaccinia nigra leguntur.

[*Translation*: "White privet flowers fall away, but the black bilberries are gathered"]

CULTIVATION. It's difficult to successfully acclimatize this bush in gardens and in collections. However, it can be propagated from seeds, but they must be planted in heath soil, in the shade, and watered often. It also can be transplanted as well as propagated by layers, which take root quite readily.

KEY TO PLATE.

Bilberry. 1. Branch and flower. 2. Stamens and pistil. 3. Open corolla. 4. Intact fruit. 5. Same, transverse section. 6. Seed, natural size and enlarged.

GORSE.

Family: LEGUMINOSAE
Reproductive system: DIADELPHY, DECANDRY

This small shrub, the European gorse [*Translator's note:* also called furze or whin], *Ulex europaeus*, LINN., grows in several of our provinces in the driest soils. The stem is three or four feet high, densely branched, forming an evergreen thicket. The leaves are small, narrow, sharp, and rough; they appear early in spring and turn into spines. The yellow flowers are on short peduncles at the ends of the branches. The asymmetric calyx consists of two or four deeply divided sections, colored, and unequal in size. The corolla is polypetalous and papilionaceous and has a carina in two sections. The ten stamens are joined by their filaments in a tube that surrounds the pistil. The ovary is oblong, cylindrical, and crowned by a style and stigma. The fruit is an oblong pod, a bit longer than the calyx, slightly swollen, and contains only a few seeds.

FLOWERS: during a large part of the year.

RANGE: France and Europe.

NOMENCLATURE. German, *Skorpionkraut, heckensamen*. English, *furre*, *whin, gorze*. Spanish, *aliaga*. Dutch, *heybrem*. Portuguese, *tojo*. Commonly called *le genet épineux* , *le jonc marin, lande* [*Translator's notes*: broom, sea-rush, heath].

USES. It can be used for decorating groves of trees in spring or autumn.

In districts where it grows naturally, it's used to feed cattle when other fodder is scarce. To do this, the young shoots are harvested and crushed with mallets on wood blocks. After the thorns are broken up, the plant provides very good nourishment for cattle and horses. Bundles of it are also used for heating ovens or for

repairing ships, as in Provence. Gorse hedges are quite common in England.

CULTIVATION. It's propagated very easily from seeds sown along with oats or with spring wheat; when the grains are harvested, the field is full of gorse. It doesn't appear to deplete the soil, and wheat will grow very well in fields producing gorse.

KEY TO PLATE.

1. European gorse. 2. Calyx. 3. Stamens.

STORAX TREE.

Family: EBENACEAE
Reproductive system: DECANDRY, DIGYNY

The storax, *Styrax officinale*, Linn., is a low densely branched tree from southern Provence. In May 1813 I found one in bloom in the Marseille botanical garden. The leaves, on petioles, are alternate, oval, soft, greenish-yellow above, whitish and downy underneath. The flowers are white, grouped four or five together in small clusters at the ends of the branches, frequently pendent. The calyx is shaped like a small cup, either with five small projections or almost entire. The corolla is funnel-shaped with a short tube; the top is divided into five or six sections. The stamens, inserted into the corolla, number from six to sixteen, but most often there are twelve. The ovary is superior and culminates in a style that is much longer than the stamens and corolla. It's evident that this tree does not strictly belong to any class of reproductive system, even though it's been assigned to decandry, digyny. The fruit is a leathery drupe containing a monospermous spherical pit.

FLOWERS: it blooms in July in Paris and northern France.

RANGE: the woodlands of southern Provence, the forest of Sainte-Baume, and the charterhouse of Montrieux. [*Translator's note*: the latter two locations are both in southern Provence].

NOMENCLATURE. *Styrax* is the ancient name for the resin that Pliny says the Arabs used to dispel the perfumes that constantly intoxicated them. Commonly called *aliboufier, storax*. German, *der storax*. English, *the officinal* [*Translator's note:* i.e. medicinal] *storax*. Italian, *storace*. Spanish, *estoraque*.

USES. Two kinds of styrax are used commercially: one is *le calamite*, a name derived from material that used to be put in reed canes; the second is liquid styrax. The first is the more highly valued. In the Levant both are obtained by making

incisions in the bark of the storax tree; in Provence only a very small amount can be recovered this way. The resin has a balsamic aroma that resembles balm of Peru. It burns with a clear flame and emits a very penetrating odor.

Storax taken internally is a diuretic; it acts as a decongestant and expectorant for chronic catarrhal conditions. Used externally, as a vapor or a tincture, it's suitable for stimulating cutaneous transpiration. It's a component of many pharmaceutical preparations, such as theriac [*Translator's note*: a medicinal antidote], Commander's balm, Fioraventi's, etc. Storax is the base for an ointment of the same name that is widely used as a stimulant and as an antiseptic for serious ulcers and gangrenous wounds.

CULTIVATION. The tree is propagated in containers by planting seeds as soon as they are ripe and also by layers that take root quite easily. In Paris and in the north of France the tree must be put in a greenhouse during winter because it will die in severe cold weather. One can take a chance on exhibiting some of the trees, but it's wise in that case to keep them in the greenhouse. Still, there's good reason for deciding to set them outside in loose, warm soil. They will decline if kept in containers because their numerous long roots are confined. In open ground they can grow out; the roots not only grow vigorously, but the tree takes on its natural shape and blossoms beautifully.

KEY TO PLATE.

531. Officinal storax tree. 1. Open calyx and pistil. 2. Open corolla and stamens.

ALMOND TREE.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, MONOGYNY.

The dwarf almond, *Amygdalus nana*, Wild., [*Translator's note*: now designated *Prunus tenella*, Batsch] is a small tree about a meter high. The stems are slender, branched, and bushy. The leaves, frequently clustered in small bunches, are alternate, dentate in wild trees, but entire or almost so in garden varieties. They are oblong, narrow, and pointed. The flowers, a delicate pink, blossom all along the stems and branches at the first sign of spring. The nut has a rough husk; the almond itself is intolerably bitter.

FLOWERS: in March and April.

RANGE: Tartary [*Translator's note*: central and western Asia], where it had been discovered by Henselman who sent it to St. Petersburg. From there it spread and became acclimatized in almost all of the gardens of Europe.

The common almond, *Amygdalus communis*, Linn., [*Translator's note*: now designated *Prunus amygdalus* and also *P. dulcis*] is a tree about thirty or forty feet high. The leaves are alternate, petiolate, lanceolate, dentate, and glabrous. The flowers are light purple or whitish; they appear before the leaves do and are sessile on the previous year's branches. The calyx is divided into five sections that have a large number of stamens inserted at their bases. Five petals likewise are inserted into the calyx alternating with its sections. The ovary is superior and culminates in a style that is slightly lateral. It converts to an oval drupe, downy and somewhat flattened, that contains a woody pit, fissured on its surface. In one variety of this tree there's a sweet almond inside; in another kind it's a bitter one.

FLOWERS: in March and April; in mild winters it blooms as early as February.

RANGE: the Levant and northern regions of Africa.

NOMENCLATURE. *Amygdalus*, derived from a Greek word meaning a crack, because the fruit is striated or creviced. German, *der mandelbaum*. English, *the almond tree*. Italian, *il mandorlo*. Russian, *mindalnoe derevo*. Tatar, *nogot*. Hebrew, *lus.* Chinese, *him ho gin*.

USES. Everyone knows about sweet almonds; they're eaten fresh in summer and served dried on the table in winter.

Sweet almonds are used very often in medicine. They serve as a base for all of the palliative and refreshing emulsions that are made up to soothe general or local irritations. Bitter almonds have been recommended by some German practitioners as a *duccédanées leses s* that is more reliable than cinchona; they even can be used successfully for expelling tapeworms. They are known to poison birds, carnivorous animals, and even humans when taken in very large quantities. An oil with a pleasant flavor, extracted from both sweet and bitter almonds, is used in medicine as a laxative, an emollient, and as a vermifuge. When the oil is combined with soda lye, one gets a soap used for visceral obstructions in the abdomen. The almond tree's wood is hard and suitable for inlay work and carpentry.

CULTIVATION. The almond tree is propagated from seeds, either in nurseries or on site. The best varieties are propagated from grafts; a slip with a dormant or an opened bud is preferable. The dwarf almond is grafted onto a plum tree or onto the common almond.

KEY TO PLATES.

650. Dwarf almond. 1. Calyx and stamens.
651. Common almond. 1. Calyx, stamens, and pistil. 2. Nut with surrounding husk removed.

ALMOND TREE.

Family: ROSACEAE.

Reproductive system: ICOSANDRY, MONOGYNY.

Duhamel tells us that the seeds of this tree, the oriental almond, *Amygdalus argentea*, LAM. [*Translators note*: now designated *Prunus argentea*], were sent from the Levant to the Duke of Ayen about 1750, and they came up very well. Since then, the oriental almond has been acclimatized in almost all of France. The branch used as the model in the adjoining figure blossomed in February 1807 and its fruit ripened the following August. The tree is about twelve to fifteen feet high. The branches are diffuse and irregular. The leaves are alternate, oblong, quite entire, whitish, and satiny, especially on their undersides. The flowers, on the ends of the branches, are delicate pink and are solitary or in pairs. The calyx is shaped like a small cup underneath; on top it terminates in five lobes. The corolla is made up of five petals arranged like a rose, rounded or slightly indented at their tops. A large number of stamens are inserted into the calyx. The ovary is superior, crowned by a style and stigma. The fruit is a cottony drupe, grooved on one side and containing one or two bitter almonds.

FLOWERS: February and March.

RANGE: the Levant. Like the common almond, it's been growing in France for a long time.

USES. Like all the trees of this genus, it heralds the return of spring. Sometimes the flowers even bloom in the snow. As a result they may suffer from frost, but in the interior of the country and in the south of France they're hardly damaged at all. In the north, however, the tree is definitely vulnerable to hard frosts. The early bloom and pretty colors of its flowers makes it sought after for large

gardens and for groves of early spring.

CULTIVATION. The tree is easily propagated from seeds, but to enjoy it sooner, it's better to graft it on the common almond. It likes loose warm soil.

KEY TO PLATE.

1. Branch of the oriental almond. 2. Flowers. 3. Intact calyx. 4. Open calyx, stamens and pistil.

FALSE INDIGO.

Family: LEGUMINOSAE
Reproductive system: DIADELPHY, DECANDRY

The false indigo, *Amorpha fruticosa*, Linn., is a tall shrub ten to twelve feet high. Its trunk is grayish and densely branched. The leaves are pinnate, composed of fifteen to nineteen leaflets, ovate, and obtuse. The petioles have two stipules. The flowers form long compact terminal spikes. The corolla is violet, without wings or keel. The calyx has five points; four are blunt and one is acuminate. There are ten projecting stamens. The fruit is a falcate pod.

FLOWERS: June and July.

RANGE: Carolina. It was introduced into England in 1724. It has been grown in open ground for a long time in France.

The dwarf amorpha, *Amorpha pumila,* Mich. [*Translator's note:* same as *A. herbacea*] is a shrub with a cylindrical stem covered with light down. The leaves are alternate, pinnate, and consist of twenty-five to twenty-nine leaflets, alternate or opposite, oblong, entire, and like those of the above species, marked with several transparent vesicles. The flowers form reddish-blue spikes. They have a calyx with five acuminate teeth and ten projecting stamens.

FLOWERS: July.

RANGE: North America. It was discovered and brought to France by Michaux. [*Translator's note*: André Michaux, a noted French botanist, was sent to the United States at the behest of Thomas Jefferson and King Louis XVI to promote exchanges of plants and trees between the two countries. He stayed in America from 1785 to1796, traveling widely and establishing nurseries in New Jersey and in South Carolina. After his return to France, his son François-André continued his father's work in America.]

NOMENCLATURE: *Amorpha*, unformed or without a shape, because the flower has neither wings nor keel, like those of the papilionaceae [*Translator's note*: a subfamily of Leguminosae] to which it belongs. German, *der unform*. English, *the shrubby bastard indigo*.

USES. Young shoots of the first species above are indeed used in America to prepare a kind of indigo.

In France, it's grown in our parks and gardens only as an ornamental plant.

CULTIVATION. These two shrubs are quite hardy in the south of France. But in the north, even in Paris, they should be sheltered and protected from the cold during harsh winters. They are propagated from seeds, from runners, and by layering. They grow well in all areas but prefer a warm exposure in loose, gravelly soil to one that is rich and fresh.

KEY TO PLATES

589. Dwarf Amorpha. 1. Complete flower.
590. False indigo. 1. Complete flower. 2. Corolla.

BEAN TREFOIL.

Family: LEGUMINOSAE
Reproductive system: DECANDRY, MONOGYNY

The bean trefoil, *Anagyris foetida*, LINN., called *the stinking wood* in the south of France, is a tree with a straight trunk six to nine feet high, branched and covered with grayish bark. The leaves are whitish and trifoliolate with three ovate leaflets that are entire and downy underneath. The stipules are opposite to the leaves. The flowers, yellow in color, form pendent clusters. The calyx is cup-shaped, with five teeth. The corolla is made up of a short standard and a very long carina. There are ten stamens, but they are not joined by their filaments. The ovary is superior; it converts to a long flattened pod containing several seeds.

FLOWERS: in April and May.

RANGE: southern France, close to Arles and to Nice.

NOMENCLATURE. *Anagyris*, from two Greek words that denote the curvature in the seed pod of this tree. German, *der stinkbaum, baumbone*. Danish, *stanktræ*. English, *stinking bean trefoil*. Italian, *legno fetide*. Polish, *palnik ogrodny*. Hungarian, *budos-fa.*

USES. The wood of the bean trefoil is heavy, yellow with a greenish tinge, but it has a strong odor. This tree can be used successfully to decorate parterres in the south of France. In Paris and in the north, it needs to be kept in a conservatory during winter, or, as Duhamel suggests, placed on an espalier and covered with straw matting. The leaves serve as resolutives [*Translator's note*: agents that disperse lesions or promote their resorption] and the seeds as emetics. If the tree is touched with slight pressure, it emits a disagreeable odor.

CULTIVATION. The tree is propagated by planting seeds in pots in the spring. At the onset of winter, it's put in a conservatory. You don't have to be particular about its location, as long as it gets enough light. It likes firm soil, and requires only ordinary care.

KEY TO PLATE.

Bean trefoil.

BOG ROSEMARY.

Family: HEATH FAMILY [*Translator's note*: these plants belong to the family ERICACEAE]
Reproductive system: DECANDRY, MONOGYNY.

The bog rosemary, *Andromeda polyfolia*, LINN., is a rounded bush about a foot high. Its clusters of pink flowers make an attractive sight in ornamental gardens. The leaves are alternate, linear, lanceolate, entire, green above and whitish below, and stiff with curled edges. The pink slightly drooping flowers are in groups of three, four, or five at the ends of the branches. They have a calyx with five small uniform sepals, and a monopetalous bell-shaped corolla with five indentations at the top. The ten stamens have anthers topped with two points. The ovary is free with a style and a stigma and five small glands at its base. The fruit is a capsule with five compartments and five valves; it contains many seeds.

FLOWERS: in May.

RANGE: France and Europe, in marshy areas.

NOMENCLATURE. German, *die andromeda mit poleyblattern, die rosmarinheide, die torforas*. Danish, *vild rosmarin*. English, *the marsh andromeda, the marsh cistus, the wild rosemary*. Russian, *bolotnik podbjel*.

USES. Though the flowers are very small, they add variety and decoration to gardens.

CULTIVATION. This bush grows well everywhere. But it prefers a shady location, and substantial soil that is loose, soft, and easily penetrable. It is readily propagated either from shoots or by separating the stalks, and it takes root very well after

transplanting. It's planted more successfully in February or March than in the autumn. There are two or three cultivated varieties that differ in the size of their leaves.

KEY TO PLATE.

1. Bog rosemary. 2. Open corolla. 3. Pistil and enlarged calices with a single stamen. 4. Fruit. 5. Seed.

ANGELICA TREE.

Family: ARALIACEAE
Reproductive system: PENTANDRY, PENTAGYNY.

The angelica tree [*Translator's note*: also devil's walking stick, Hercules' club], *Aralia spinosa*, Linn., is a tree four or five meters high. The trunk is straight and thick, reddish brown at the top, and armed with many short thorns. The leaves at the top of the trunk are large, several-fold compound, imparipinnate, with dentate and pointed oval leaflets. The numerous flowers are very small, white, and clustered in panicles at the tips of the branches. The calyx adheres to the ovary and is edged with five points. The corolla has five petals, and there are five stamens. The ovary is crowned with five styles, and turns into a berry with five compartments. It's reddish brown when ripe.

FLOWERS: August and September.

RANGE: North America.

NOMENCLATURE. In 1704 this tree was sent from Quebec to Fagon, the chief physician to Louis XIV, under the name *aralia*, which suggested a Canadian origin [*Translator's note*: *aralia* was the name given to the tree by the French in Canada]. It's commonly called *l'angélique épineuse, l'angélique sauvage* [*Translator's note*: thorny angelica, wild angelica]. German, *der stachlichte angelik baum*. Dutch, *ged oornde aralia*. English, *the thorny aralia*.

USES. Its foliage and abundant flower panicles add variety to large gardens. It's claimed that American natives take infusions of it for the pangs of rheumatism and to cure dropsy.

CULTIVATION. In the north of France, the tree is vulnerable. It's liable to succumb during harsh winters, so it should be protected from north winds and its base covered with straw. If it dies, the stock should not be pulled up because it will grow shoots again the following spring. It does well in winter in central and southern France. It's propagated by root suckers and by sowing seeds in manure beds in springtime. The berries are polyspermous;

so before they are sown they need to be soaked in water for several hours and crushed by hand to get the seeds out of them. They will sprout only in the second year.

KEY TO PLATE.

490. 1. Leaflet, natural size. 2. Complete flower, enlarged. 3. Calyx and pistils. 4. Berry, natural size. 5. Same, enlarged. 6. Same, enlarged, transverse section.

BEARBERRY.

Family: ERICACEAE.
Reproductive system: DECANDRY, MONOGYNY.

The bearberry, *Arbutus uva ursi*, LINN. [*Translator's note*: the modern scientific name is *Arctostaphylos uva-ursi* Spreng.] is a small tree covered with pretty red fruit that I located in the *Basses-Alpes* in June 1813. Its stem lies practically on the ground, furnished with sparse leaves that are entire, ovate, and wider near their tips. The flowers grow in small, white, slightly purplish clusters at the ends of the branches. There are ten stamens with smooth anthers. The ovary turns into a beautiful red berry when ripe. It has five compartments that contain five seeds.

FLOWERS: March and April.

RANGE: The Alps, the Pyrenees, the Vosges, and the Jura.

NOMENCLATURE. German, *die barentraube, mehlbeere*. Danish, *meelboer – riis.* English, *the bear berry*. Polish, *borowka*. Hungarian, *medver szolo*. Colloquial French, *la bousserole, la buxerole, le raisin d'ours, l'arbousier trainant* [*Translator's note*: bear's grape (*uva ursi*), trailing arbutus].

USES. The tree's red fruit and evergreen foliage add variety to our ornamental gardens.

CULTIVATION. It's propagated by planting the seeds in trays as soon as they are ripe or ready. The trays are placed in a southeast exposure until the seeds sprout. When the seedlings are an inch high,

they're put in small pots until they're strong enough to be planted in the ground. The tree likes loose soil, heather compost, and a partly shaded location.

KEY TO PLATE.

Bearberry. 1. Whole fruit. 2. Same, transverse section. 3. Same, longitudinal section. 4. A compartment of the fruit. 5. Seed.

STRAWBERRY TREE.

Family: HEATH FAMILY
Reproductive system: DECANDRY, MONOGYNY.

The strawberry tree, *Arbutus unedo*, LINN., is merely a large shrub in Provence, but in the islands of the Aegean it grows to tree-height. Its beautiful red fruit makes a lovely sight along the edges of bluffs and ravines where I've often observed it. The tree has a straight, cylindrical, reddish trunk. The flowers, yellowish-white or red, are in pendent clusters at the ends of the branches. The leaves, on short petioles, are alternate, oval-lanceolate, shiny, leathery, and non-deciduous with serrate margins. The calyx is small and has five teeth. The corolla is monopetalous, oval-oblong, urceolate, formed of transparent material and divided at its top into five reflexed crenations. There are ten stamens. They are shorter than the corolla; their wide bases are inserted into it. The anthers are pierced with two holes. The ovary, topped with a style and stigma, turns into a round pendent berry. Its surface is uneven because of the large number of osseous seeds projecting from it. The fruit, green at first, then yellowish, turns red when it is ripe, giving it the appearance of a strawberry.

FLOWERS: September and October.

RANGE: Provence and several other parts of southern France.

NOMENCLATURE. German, *der Erdbeerbaum, der Hagapfelbaum*. English, *the strawberry tree*. Italian, *arbuto, corbezzolo*. Spanish, *madrono*. Russian, *ljesnaja jablon*. Hungarian, *vad-alma-fa*. In Constantinople, *komaria*. Commonly called *le fraisier en arbre, l'arbre à fraises.* [*Translator's note*: the strawberry bush tree, the strawberry tree.]

USES. The fruit and evergreen leaves are lovely in places inside France where they're not damaged by the cold. But it's hard to maintain the tree in open ground in the northern provinces. The fruit occasionally is eaten in Provence, but it's not very pleasant and it's a strong laxative. The species name, *unedo*, abbreviated from *unum edo*, means that it's enough to eat just one.

CULTIVATION. In the south of France, it propagates on its own. But around Paris, it's propagated as soon as the fruit has ripened by planting the seeds in trays full of somewhat loose soil. The pots are positioned toward the southeast until the seeds sprout. When the seedlings are four or five inches tall, they are planted in small pots and left in a conservatory over the winter until they're sturdy enough to be put in the ground. The tree is also propagated by layering done in February or at the beginning of March. A variety of this tree has red flowers.

KEY TO PLATE.

1. Strawberry tree. 2. Intact corolla. 3. Calyx and pistil. 4. Corolla enlarged and opened to show stamens.

SEA BUCKTHORN.

Family: ELAEAGNACEAE
Reproductive system: DIOECY, TETRANDRY.

The sea buckthorn, *Hippophae rhamnoïdes*, Linn., is a large, very densely branched shrub. The ends of the branches usually are thorny and bent. Its bark is gray-brown. The leaves are narrow, oblong, almost obtuse, grayish green above and silvery-gray with scattered russet scales underneath. The flowering plants are dioecious; the male flower has a calyx with two deep divisions and four anthers with very short filaments. The females have a calyx with two divisions that are not as deep as those in the male. Either one or the other flower can appear before the leaves develop. The calyx is adherent to the ovary, which terminates in a thick stigma and develops into a globular orange-yellow berry with a single compartment containing one seed.

FLOWERS: in April.

RANGE: moist sand; the dunes of the Mediterranean seashore.

NOMENCLATURE: *Hippophae*: a name composed of two Greek words that mean horse and light. It was a name for an unknown plant that was thought capable of giving sight to horses. Commonly called *argousse, faux nerprun* [*Translator's note*: false buckthorn]. German, *haffdorn, werdendorn, seedorn*. Dutch, *duinbessen*. English, *sea buckthorn*. Spanish, *spino amarillo*. Russian, *rakitnik*.

USES. The sea buckthorn is grown in a number of groves where its whitish foliage contrasts handsomely with the green of the other trees.

The bark of the trunk is an astringent, and the flesh of the its fruit has a tart flavor. According to Villars [*Translator's note*: Dominic Villars, 1745-1814, French botanist and taxonomist] the inhabitants of Dauphiné use it for seasoning and also as a decoction to treat vermin and skin diseases of animals.

CULTIVATION. It's propagated by layering in compost. It grows well in almost all areas but prefers loose soil.

KEY TO PLATE.

511. 1. Sea buckthorn with female flowers. 2. Same, with male flowers. 3. Complete leaf. 4. Complete male flower. 5. Same, opened showing stamens. 6. Complete female flower. 7. Same, longitudinal section. 8. Fruit.

AZALEA.

Family: RHODORACEAE. [*Translator's note*: *Azalea* is now considered to be a subgenus of *Rhododendron.* The latter name was instituted by Tournefort (see translator's note under **USES** below). It includes the three species described below; their current scientific names are indicated in brackets. *Rhododendron* is now assigned to the family Ericaceae.]

Reproductive system: PENTANDRY, MONOGYNY.

THE WHITE SWAMP HONEYSUCKLE, *Azalea viscosa*, Linn. [=*Rhododendron viscosum*] is a bush about a meter high. The leaves are a pleasant green color, lanceolate, and feel rough to the touch along their margins. The flowers are white, sticky, hairy, and are surrounded by a clump of leaves. In collections their color varies from red to pink etc. characteristic of the many varieties of the same species.

FLOWERS: June and July.

RANGE: North America. This species acclimatized more than fifty years ago to almost all of the gardens in France where it had been planted.

NOMENCLATURE: German, *der meybusch*. Dutch, *lymerige azalea*. Swedish, *maybolester*. English, *the white sweet azalea.*

THE PINK AZALEA, *Azalea nudiflora*, Linn. [=*Rhododendron nudiflorum*, Torr.], is an irregularly-shaped bush about a meter high. The oval leaves, smooth on top, are gathered near the ends of the branches. The flowers vary from white to deep red. They are slightly hairy and have extremely long stamens.

FLOWERS: May and June.

RANGE: North America, acclimatized in Europe.

THE YELLOW (PONTIC) AZALEA, *Azalea pontica*, Linn. [=*Rhododendron ponticum*, L.], is a bush about a meter high [Translator's note: *ponticum* is from the Latin name for the Black Sea, the region where the tree grows]. The leaves are lanceolate, light green, smooth, non-deciduous, and clustered at the tips of the branches. The yellow flowers on peduncles form terminal clusters. They are large, fragrant, and very open.

FLOWERS: in the spring.

RANGE: around the Black Sea.

NOMENCLATURE. German, *der pontische felsenstrauch*. Dutch, *oostersche azalea*. Russian, *odur cawkaski*. Georgian, *jæli*. Azalea, from the Greek word meaning dry or arid, indicating the area where this bush grows naturally.

USES. Azaleas are grown quite widely in gardens as an ornamental plant. The flowers that vary from pink to purple, yellow, etc. create the best effect; several of them are fragrant. Quite often the leaves don't develop until after the flowers bloom. The leaves of the yellow azalea are non-deciduous. Tournefort, in his *Voyage to the Levant* describes this species with yellow flowers under the name *chamærhododendros*. [*Translator's note*: Joseph Pitton de Tournefort, 1656-1708, was a prominent French botanist and a professor at the King's Garden (Jardin des Plantes) and at the Collège de France in Paris. He traveled widely in the Levant collecting botanical specimens. A street in Paris is named for him]. He claims that the flowers stimulate vapors and cause dizzy spells. The honey that bees get from them, he says, stupefies those that eat it and brings on nausea. On this point he recalls the misfortune that befell Xenophon's Army of Ten Thousand on their way to Trébisonde. [*Translator's note*: this is now the Turkish town of Trabzon (Trapezus in antiquity) on the southeast shore of the Black Sea. The episode is described in Xenophon's *Anabasis*, bk. IV, ch. 8.] His soldiers, after eating a lot of honey, in the course of a single day suffered severe evacuations, both from above and below, followed by dizziness and delirium. As a result, the ground was strewn with bodies as though a battle had taken place; but nobody actually died.

CULTIVATION. Azaleas are propagated by layering and from shoots that often grow profusely, especially when they are in a soft, rich, and loose soil. One must wait for the shoots to be well rooted to lift them. They'll be lost if withdrawn too soon. Generally these bushes are very hardy and are never harmed by the cold. If one wishes to grow them from seeds, the seeds must be sown on a layer of heather compost in early spring. M. Desfontaines, in his excellent work on the trees and shrubs of France, says to set it up in a frame covered with straw matting to block the sun's rays. When they're gone, the seed bed is aerated and watered from time to time with a watering can. This will keep the water from evaporating like dew.

KEY TO PLATES.

Swamp azalea. 1. Stamens and pistil. 2. Stamen, enlarged.
Pink azalea. 1. Stamens and pistil.
Yellow azalea. 1. Open corolla. 2. Stamens and pistil.

CHINABERRY TREE.

Family: MELIACEAE.
Reproductive system: DECANDRY, MONOGYNY.

The chinaberry tree [*Translator's note*: also called pride of India], *Melia azedarach*, Linn., originally from Asia, is now acclimatized in Spain, in the southern provinces of France, and endures the winter in open ground in the gardens of Paris and its surroundings. It's a tree ten to twelve feet high with blackish bark and densely branched at the top. The leaves, gathered at the ends of the branches, are alternate, bipinnately compound with oval, pointed, toothed, often lobed, smooth leaflets. The flowers are on the ends of the branches in upright clusters. The calyx is small, with five divisions. The corolla is white, tinged with violet, with five open oblong petals. The ten stamens insert inside the top of a notched tube, or cylindrical nectary, that surrounds the pistil. The stigma forms its head. The fruit is a round nut, fleshy, with five monospermous compartments.

FLOWERS: in July.

RANGE: Asia, acclimatized in France.

NOMENCLATURE. *Melia*. Greek name for the ash tree, which this one resembles in its foliage. *Azedarach*, the name that the Arab physician Avicenna used for it, (bk. 4). Commonly called *l'arbre aux patenôtres, le lilas des Indes, le margousier, l'arbre saint* [*Translator's note*: paternoster tree, lilac of India, sacred tree]. English, *bead-tree*. German, *zederach*, *gemeine melia*. Italian, *paternostro*. Spanish, *el cinamomo*. Portuguese, *amargoseira*. Arabic, *zœnzalacht*. Chinese, *Xun lien*.

USES. The tree in bloom makes a very fine sight in a garden. Its wood is light red, extremely hard, and takes a beautiful polish. It could become widely used for inlay work, especially in the south of France, where it grows forty or fifty feet high.

The fruit of the chinaberry tree is toxic. It's been used to poison dogs.

In Persia, the flesh is used for curing mange and ringworm by mixing it with grease in order to rub it in. The flowers once were used as a laxative and were suitable for obstructions, but they are no longer used medically. In the United States the skin of the roots is used as an effective vermifuge; this remedy should be administered with great caution.

CULTIVATION. The tree is propagated from seeds sown as soon as they are ripe. But in the north of France, the seedbeds have to be sheltered from extreme cold. Soil used for orange trees suits them best.

KEY TO PLATE.

521. Chinaberry tree. 1. Calyx and pistil. 2. Opened interior tube with stamens.

BLADDER SENNA.

Family: LEGUMINOSAE

Reproductive system: DIADELPHY, DECANDRY

The bladder senna, *Colutea arborescens*, LINN., grows ten or twelve feet tall. The trunk is straight, densely branched, with alternate, imparipinnate leaves that are made up of nine to eleven leaflets, oval-rounded and obtuse at their indented tips. The flowers are yellow and are arranged in sparse clusters. The green calyx is a single unit with five sepals. The papilionaceous corolla has a large uplifted standard marked at its base with a reddish line. The carina is smaller than the standard, but larger than the wings. The ten stamens, joined into two bunches, are enclosed in the carina. The ovary is longer than the stamens; it turns into a diaphanous vesicular pod containing twenty to thirty seeds attached inside along both sides of the bottom suture.

FLOWERS: during the whole summer. It often bears flowers and fruit at the same time.

RANGE: southern France, Italy, and the Levant.

NOMENCLATURE. German, *der Blasenbaum, der Linsenbaum*. English, *common-bladder-senna*. Italian, *solano, solatro*. Spanish, *espanata-lobos*. Commonly, *le faux séné* [*Translator's note*: false senna].

HISTORY. The bladder senna appears to have been noted by Theophrastus [*Translator's note*: The Greek philosopher Theophrastus, 372-287 B.C.E., a successor to Aristotle, wrote important botanical treatises]. Thereafter there was no further mention of it in any botanical works until it was described by writers in the sixteenth century.

USES. This tree ought to be included in groves in spring and in autumn, because its flowers make a very lovely appearance in both seasons.

Its shrubbery is uneven, so it's best to plant it in groves rather than by itself. Its abundant flowers and pretty foliage have drawn attention to it for a long time; it's found in practically all ornamental gardens. The leaves and seed pods are purgatives and are a substitute for those of the senna. In some countries the fruit is used to fatten sheep and to make them produce a lot of milk. It's also good for poultry.

CULTIVATION. Bladder sennas are readily propagated from seeds and from offshoots. The seeds are planted in a bed supplied with good soil, or in a previously used compost layer, and kept slightly shaded. They come up quickly, but since a number of insects feed on the seedlings, it pays to check on them often until they are about a foot high. They are left in the seed bed until the following spring. At that time they can be put in a nursery to be permanently planted in the autumn, or even placed right away in their intended location.

KEY TO PLATE.

1. Branch of bladder senna with flowers and fruit. 2. Calyx, stamens and pistil. 3. Standard of the corolla. 4. Wings. 5. Carina.

BLADDER SENNA.

Family: LEGUMINOSAE
Reproductive system: DIADELPHY, DECANDRY

THE ORIENTAL BLADDER SENNA, *Colutea orientalis, Linn.* is an extremely pretty oriental shrub acclimatized in almost all of our gardens. Its stems, about two meters high, have numerous branches. The leaves are pinnate, with seven or nine leaflets only slightly (or sometimes not at all) indented at their tips. The corolla is yellowish red or blood-red; the standard has two yellow spots at the base. The fruit is an inflated pod that opens by itself at the tip.

FLOWERS: June and July.

RANGE: the Levant. It's also claimed to be in the area around Strasbourg.

THE SHRUBBY BLADDER SENNA, *Colutea frutescens, Linn.* is a very small bush remarkable for the beautiful color of its flowers. It's about a meter and a half high. Its stem and branches are covered with whitish hair. The compound leaves consist of fifteen to nineteen small deep green oval leaflets. The corollas are a handsome scarlet red, arranged in axillary clusters, frequently pendent.

FLOWERS: July.

RANGE: Africa.

USES. Both of these bushes have contributed to the ornamentation of our gardens and collections for a long time.

CULTIVATION. The bushes are readily propagated from cuttings. They also can be grown from seeds, but the latter must be sown in a manure bed and the seedlings sheltered in a conservatory from severe cold. Nevertheless, since they bloom during the same year that they are planted, small clumps of earth with two or three plants can be lifted from the bed and put in open ground in September. You'll get lovely bushes full of flowers.

KEY TO PLATES.

[*Translator's note*: Illustrations and descriptions are in the author's sequence. Not all of the key numbers in the illustrations are described.]

Oriental bladder senna. 1. Seed pod.
Shrubby bladder senna.

PAPER MULBERRY.

Family: URTICACEAE. [*Translator's note*: the *Broussonetia* genus is now assigned to the family Moraceae]
Reproductive system: DIOECY, TETRANDRY.

The *broussonetia,* or paper mulberry, *Broussonetia papyrifera*, LHER., *Morus papyrifera*, LINN., is an interesting tree that has been acclimatized in our parks and gardens for several years. Its trunk is twenty or thirty feet high, and its branches form a large top. They are hairy when young. The leaves come in a variety of shapes. Some are ovate, entire, or toothed; others are lobed, or entire on one side and lobed on the other. All are dark green and hairy. The male flowers form cylindrical catkins; they are found on separate plants from the female flowers. The calyx is divided into four, with four resilient stamens. There is no corolla. The female flowers are globular, quite similar to those of the plane tree. Their calyx has four divisions. It is inserted into an extended receptacle that projects beyond the calyx and becomes fleshy.

FLOWERS: in March

RANGE: China, Japan, and the South Sea islands.

NOMENCLATURE. *Broussonetia*, from V. Broussonet, a French naturalist, who traveled in Barbary and brought the first female individual of this tree to France from England [*Translator's note*: Broussonet, 1761-1807, was a naturalist, physician, and professor of botany at Montpellier; Barbary is the coastal region of North Africa]. German, *papierbaum*. English, *paper mulberry tree*. Japanese, *kaadsi*. A Otaïti, *eaowte*.

USES. It got the name paper mulberry because in Japan and China paper is made from pulp prepared from the bark of the young branches. For this purpose it could be extremely useful in France, as shown by the experiments of Faujas Saint-Fond [*Translator's note* : Barthélemy Faujas de Saint-Fond, 1741-1819, botanist and professor of geology at the Jardin des Plantes, Paris], especially since raw materials for our paper go up in price daily. According to Captain Cook,

South Sea island natives prepare a kind of unwoven material from the bark [*Translator's note*: tapa cloth] that they use for clothing.

It's desirable that this tree be cultivated on a large scale for its great utility. [*Translator's note*: later reports revealed that the quality of the paper failed to live up to these enthusiastic expectations, and that silkworms (see below) could not survive on the leaves.] Its leaves serve as fodder for cattle, and especially for sheep, which are very fond of it in both summer and winter. For this purpose it's kept bushy and pruned every year in August. Half of the branches are cut at ground level for immediate use or for drying.

CULTIVATION. The tree is readily propagated from seeds that are generated abundantly from one male plant plus several females. It's also propagated from runners, cuttings, and grafts. The roots extend a long way and put out a lot of shoots. It grows in practically all areas, but it prefers fresh, loose soil. M. Desfontaines [*Translator's note*: René Louiche-Desfontaines, 1750-1833, French botanist] says that he has seen silkworms eat the leaves even when they were mixed with those of the white mulberry.

KEY TO PLATES.

[*Numbering corrected by translator*.]

Male paper mulberry. 1. Calyx and stamens.
Female paper mulberry. 1. Female catkin (transverse section) and receptacle.

HEATH.

Family: ERICACEAE.
Reproductive system: OCTANDRY, MONOGYNY.

The tree heath, *Erica arborea*, LINN., is quite a common tree in southern Provence; it's an ornamental in conservatories in northern France in early spring. Its trunk is five or six feet tall. The leaves are small and narrow, arranged in threes or fours along the branches. The flowers are white or light pink; they're arranged in small lateral clusters. The calyx is four-lobed. The corolla, rather elongated, is bell-shaped and terminates in four points. The stamens do not extend beyond the corolla's tube. The ovary is superior; it turns into a capsule with a lot of seeds.

FLOWERS: from February to May.

RANGE: Provence and Languedoc.

NOMENCLATURE. *Erica* seems to be derived from a Greek word meaning to break, because according to Pliny, several kinds of heather were reputed to be able to dissolve kidney stones.

The winter heath, *Erica herbacea*, LINN., despite its species name, assigned because its flowers are greenish in autumn, has a woody stem like that of other heathers. They are a pleasant pink color in spring, which earned the plant another name, *flesh-colored heath*, as though it were no longer the same one. The leaves are whorled in fours. The flowers, on a short peduncle and located at the axillae of the upper leaves, frequently point away from the outer side of the branch that they're on. The calyx has four leaflets. The corolla is monopetalous, with four rather inconspicuous lobes. The eight stamens are longer than the corolla. The ovary is topped by a style that's even longer than the stamens.

It turns into a pod with four compartments that contain many seeds.

FLOWERS: autumn. The flowers develop their color in January and February.

RANGE: Basses-Alpes, Savoy, Piedmont.

The cross-leaved heath, *Erica tetralix*, LINN., is a foot or two tall. The leaves are small, sessile, ciliate on their edges, and distributed on the branches in fours. The flowers, numbering six, eight, or ten at the tip of each branch, are pink or sometimes white. Their calyx has four deeply divided sections. The monopetalous bell-shaped corolla has four small points at the top. The superior ovary turns into a small pod with several compartments that contain a lot of seeds.

FLOWERS: at the beginning of summer and at the end of autumn.

RANGE: France, in peaty areas.

USES. The heaths make a pleasant appearance in conservatories in the north of France. In our southern provinces, they can be cultivated in open ground, where most of them grow naturally. Several kinds of heather are used for making brooms and to fuel ovens.

CULTIVATION. They like loose soil that can be penetrated by their slender root hairs. They are propagated by seed planting as well as by layering, but the latter method isn't as good.

KEY TO PLATES.

1. Tree heath. 2. Complete flower, enlarged. 3. Stamens and pistil, same. 4. Stamens, enlarged.

1. Winter heath. 2. Complete flower, enlarged. 3. Stamen. 4. Stamens and pistils [*numbering corrected by translator*].

1. Cross-leaved heath. 2. Complete flower, enlarged.

RESTHARROW.

Family: LEGUMINOSAE.
Reproductive system: DIADELPHY, MONOGYNY.

The tall restharrow, *Ononis altissima*, Lam., is a perennial plant three or four feet high. The upper part of its straight stem is covered with glandular hairs. The branches never get thorny as they do in most of the other species. The upper leaves have a single leaflet; the lower ones have three. Both kinds have broad, dentate stipules. The large flowers are a pretty purple-pink color and are arranged on somewhat narrow, leafy, terminal spikes. The standard is much larger than the wings and the carina. The calyx is covered with glandular hairs.

FLOWERS: July.

RANGE: sandy regions of the southern provinces.

The goatroot ononis, *Ononis arvensis*, Lam., is a plant with very vigorous horizontally extended roots. The stems, often recumbent but straightened up at their tips, are reddish and hairy. The leaves are compound with small, ovate, toothed leaflets; the upper leaves often are simple. The red flowers are axillary and solitary. The standard is striped and very large. The branches almost always get thorny as they age. One variety of this species, called *Ononis repens*, always has a recumbent stem and rounder leaflets.

FLOWERS: July and August.

HABITAT: sandy soils.

NOMENCLATURE. The name *Ononis* comes from a Greek word that means donkey, since donkeys eat this plant. The common name, *arrête-boeuf,* comes from its strong deep roots that can stop an ox and plow [*Translator's note*: *arrête-boeuf* means to stop an ox and its plow, hence restharrow]. The names *bugrande, bugrane* are from *bu*, celtic for an ox [*Translator's note*: the French name for this plant, *bugrane,* comes from the Greek *boukranon*, skull or cranium of an ox]. German, *hauhechel, hachelkraut*. Dutch, *stalkrind*.

English, *rest harrow* or *cammock*. Italian, *restabove, bulimaca*. Spanish, *detiene-buey, remora de arado*. Russian, *iglischnik*.

The yellow-flowered restharrow, *Ononis natrix*, Linn., is an undershrub about two feet high. The densely branched stem and the branches themselves are covered with a sticky nap. The petiolate leaves consist of three ovate oblong leaflets, toothed only at their tips. The floral leaves are simple. The yellow flowers are on quite long peduncles that end in a small thread. The standard, much larger than the wings or the carina, is marked with purple streaks.

FLOWERS: from May until September.

RANGE: France, along roadsides and woodlands.

NOMENCLATURE. *Natrix*, the name of a water snake, was given to this plant because, according to Dalechamp [*Translator's note*: Jacques Daléchamps, 1513-1588, French physician and botanist] it was thought to be able to dispel snakes, ghosts, etc.

USES. The tall restharrow makes a beautiful impression in large flower gardens with its broad tufts and long spikes. The other kinds are grown only in botanical gardens.

CULTIVATION. Restharrows grow well in all areas, though they prefer loose warm soils. They are propagated easily from seeds and root suckers.

KEY TO PLATES.

[*Translator's note*: plate numbers and keys are in the author's sequence]

507. Tall restharrow. 1. Calyx and stamens. 2. Calyx and new fruit.
508. Goatroot ononis.1. Calyx. 2. Corolla.
509. Yellow-flowered restharrow. 1. Open calyx, stamens, and pistil.

SHRUBBY RESTHARROW.

Family: LEGUMINOSAE.
Reproductive system: DIADELPHY, DECANDRY.

The shrubby restharrow, *Ononis fruticosa*, LINN., is a bush that grows two or three feet high. It has a whitish or ash-colored woody stem with leaves along its entire length. The petioles are very short and are surrounded by a stipule shaped like a sheath. The leaves consist of three or more almost sessile leaflets that are lanceolate, rather narrow, smooth, green, and serrate. The red flowers are arranged two or three together on each peduncle and form beautiful clusters at the tops of the stems. The calyx is a single unit and has five divisions. The papilionaceous corolla has a rounded, oval standard, narrow obtuse wings, and an oval carina. The ten stamens have nine of their filaments joined together; the tenth is separate. The superior ovary is topped by a style with a simple stigma. It becomes a short inflated pod with one compartment containing several seeds.

FLOWERS: from June until October.

RANGE: the mountains of Dauphiné.

NOMENCLATURE. English, *purple-flower'd shrubby restharow* . German, *strauchartige Hauhechel, wild*. In France it's been given the common name *arrête-boeuf* because several species of this same genus, although they are merely grasses, nevertheless spread widely and put down sturdy roots that greatly inconvenience plowmen [see *translator's note* on *arrête-boeuf* above].

USES. This shrub belongs to a genus of plants that are almost all herbaceous. Duhamel [*Translator's note*: Henri-Louis Duhamel du Monceau, 1700-1782, distinguished French botanist, writer, and Inspector General of the French navy] says it ought to be grown around the borders of springtime groves because in full bloom it makes an attractive display. The root is thought to be a laxative.

CULTIVATION. It's grown with great ease in almost all areas. But it does best in loose, warm soil. It's easily propagated from seeds sown in beds of loose earth. It then should be planted in small pots. In northern France it has to be protected from frost for about two years because of its sensitivity to cold. At the end of this period, if the saplings are sturdy, they can be planted permanently. The bush becomes very hardy thereafter.

KEY TO PLATE.

1. Branch of the shrubby restharrow. 2. Calyx. 3. Corolla made up of the standard, carina, and two wings. 4. Stamens. 5. Open fruit. 6. Seed.

BOX.

Family: EUPHORBIACEAE [*Translator's note*: this species is now classified in the family Buxaceae]

Reproductive system: MONOECY, TETRANDRY.

There are several known varieties of the common box, *Buxus sempervirens*, LINN. When our gardens were planted on a precise plan, the one called *dwarf box, Artois box,* contributed greatly to their ornamentation. It outlined the contours of parterres, and it could be made to take on all shapes and orientations. In southern provinces the box grows very tall, but around Paris it only reaches about ten or twelve feet. It has lots of twisted branches. The leaves are opposite, ovate, oblong, and sometimes lightly indented. The flowers form little bunches at the axils of the leaves. They are yellowish and have a calyx with four sepals. The male flowers are surrounded at their base by a scale with two lobes; they have four stamens with very short filaments inserted under the rudiment of the ovary. The female flowers have three small scales at their base, an ovary topped by three persistent styles, and three obtuse stigmata. The fruit is a three-pointed capsule with three compartments containing six seeds.

VARIETIES.

1. Dwarf box: very short stem that hardly ever grows higher than two or three feet.
2. Box, leaves variegated with yellow.
3. Box, leaves variegated with white.

FLOWERS: during April.

RANGE: France and much of Europe.

NOMENCLATURE. German, *der buchs*. English, *buxbom*. Italian, *busso*. Russian, *samchith*. Polish, *bukspan*. Persian, *schimshat*. Turkish, *tschemtschir*.

USES. The variegated box on its own creates a very fine impression in winter groves. It also can be planted in coverts where it will provide convenient shelter for game.

The wood of this shrub is heavy and very hard, which makes it valuable for wood carvers, inlay, and lathe workers.

Some doctors substitute boxwood sawdust for that of guaiac wood in sudorific infusions. The fetid oil that it yields is good for epilepsy, flushes, and toothaches.

CULTIVATION. The box spreads via seeds that sprout in woodlands without any attention at all. It's propagated in the shade and in fresh soil from cuttings as well as from layers and rooted shoots. Boxes in flower gardens must be pruned with shears every year so that they flourish for a long time and make attractive borders.

KEY TO PLATE.

1. Common box. 2. Female flower. 3. Male flower. 4. Same, opened up. 5. Fruit.

HARE'S-EAR.

Family: UMBELLIFERAE.

Reproductive system: PENTANDRY, DIGYNY.

Duhamel says that the shrubby hare's-ear, *Buplevrum fruticosum*, LINN., should be planted in winter groves because it doesn't shed its leaves and it helps decorate them. Its stems and smooth, profuse cylindrical branches form thick bushes five to six feet high. The leaves are alternate, ovate-oblong, firm and smooth, with entire margins and are slightly narrowed toward their bases. The flowers are grouped in umbels with involucres and involucels. The calyx is small and entire. The corolla has five entire, semicircularly curved equal-sized petals. The five stamens alternate with the petals. The adherent ovary is crowned with two styles. The fruit is a streaked, ovoid, poly-achene, slightly convex on both surfaces. It's formed from two indehiscent parts, each containing one seed.

The leaves of almost all of the hare's-ears are simple; this makes them different from those of other umbelliferous plants. To explain this peculiarity, it's been said that they are merely foliaceous petioles whose blades failed to develop naturally. But the same could be said for all leaves. I think this is just an example of a special and established law of nature that gave them leaves that are different from those of other umbelliferous plants.

FLOWERS: July and August.

RANGE: Provence and several other parts of southern France.

USES. It can add to the variety of gardens in winter because it forms tufted bushes and its seeds attract birds. The leaves have a very appealing scent of anise.

CULTIVATION. This shrub is found in open ground all over France, but, says M. Dumont-Courset, it's often damaged in northern provinces. I've kept one in these circumstances for several years, at least since 1789, and every year it's been damaged right down to its base in spite of its being covered. However, it will survive when planted in ordinary soil and in a spot where it's sheltered, especially on its eastern side. The main point about preserving this shrub is to plant it in a way that it can strengthen and not grow too much during the summer. It's propagated by sowing the seeds in slightly loose soil as soon as possible after they ripen.

KEY TO PLATE.

1. Shrubby hare's-ear. 2. Complete flower (enlarged). 3. Fruit, natural size. 4. Same, enlarged.

CACTUS.

Family: NOPALEÉS. [*Translator's note*: the family is now called Cactaceae.]
Reproductive system: ICOSANDRY, MONOGYNY.

The prickly pear cactus, *Cactus opuntia*, LINN. [*Translator's note*: the genus name is now *Opuntia*; it includes many species], is found in Provence acclimatized in the most barren spots, often among rocks. I've eaten its fruit on occasion; it's sweet, rather bland, and much inferior to that of the fig tree which is carefully cultivated in this province [*Translator's note*: the author may be referring to the *figuier d'Inde* or Indian fig tree, *Opuntia ficus-indica*.] The stalk of this candle-like tree is made up of flattened, fleshy, oval or oblong segments set one above the other. It grows seven or eight feet high and becomes almost cylindrical as it ages. The segment joints, as well as the calyxes, are studded with clusters of short, irregular yellow spines. Occasionally there are one or two small, deciduous, cylindrical, pointed leaves at the bases of the spines. The flowers, situated at the tops of the upper segments, are a pale yellow. The calyx is ovoid and fleshy. The corolla consists of a number of irregular petals arranged in several rows. There is a very large number of stamens on the calyx. The ovary is simple, adherent, and crowned by a single style with a five-lobed stigma. The fruit is a red, pulpy, ovoid berry containing several seeds.

FLOWERS: June and July.

RANGE: southern America, and acclimatized in Provence and Piedmont.

NOMENCLATURE. The genus name [*Translator's note: i.e Cactus*] comes from the Greek verb *kaiô,* to burn, because the prick of its spines causes a burning pain. In German it's called *die gemeine indianische feige* [*Translator's note:* common Indian fig]. Dutch, *gewoone vygplant*. English, *the common indian fig*. Spanish, *tunal, higos de pala*. Commonly, *le figuier d'Inde, la semelle du pape* [*Translator's note:* Indian fig, the pope's slipper].

USES. The fruit is refreshing; it's eaten after removing the spines. In northern France cactus is grown only as an ornamental and for variety in temperate greenhouses, because it won't survive outside in the open.

CULTIVATION. The cactus tree appears in many different shapes, and growers have identified several varieties. One has obround leaves and lacks spines, a second has oblong leaves and bristle-like spines, a third, oblong leaves (thicker than those of the preceding variety) and long yellow spines, and a fourth has long, slender leaves and very long blackish spines.

The cactus tree is propagated in June from cuttings. Gentle, free soil suits it best. One should take care to put pieces of plaster debris in the bottom of the pot.

KEY TO PLATE.

1. Prickly pear cactus. 2. Longitudinal section of flower to show stamens and pistil.

CAROLINA ALLSPICE.

Family: ROSACEAE. [*Translator's note*: this plant is now assigned to the Calycanthaceae family.]

Reproductive system: ICOSANDRY, POLYGYNY.

The Carolina allspice, *Calycanthus floridus*, Linn., is a densely branched, broad shrub eight or ten feet high. The leaves are opposite, ovate, entire, and whitish underneath. The flowers are red-brown. The colored sections of the calyx are linear and lanceolate, with light down. Ligulate petals of the same color and recurved at the top are inserted into the calyx. A large number of stamens, shorter than the petals, also are inserted into the calyx. The ovaries terminate in acuminate styles; they turn into seeds enclosed in the calyx, which thickens and becomes an oval berry.

FLOWERS: from May until August.

RANGE: Carolina; cultivated for a long time in our parks and gardens.

NOMENCLATURE. Originally the plant was named *pompadoura,* in honor of the duchess de Pompadour. Its present name Calycanthe means *calycine flower* because its calycine sepals are colored like the petals. Miller [*Translator's note*: Philip Miller, 1691-1771, English botanist and horticulturist] had called it *Basteria*, in memory of Job Baster, a Dutch botanist. Commonly, *l'arbre aux anémones* [*Translator's note*: the anemone tree]. German, *der specereystrauch*. English, *all spice*.

USES. This shrub has beautified our parks and large gardens for a long time. At the close of day it emits a pleasant aroma of pineapple or pippin apple. The bark is aromatic and fragrant. It's an ingredient of a table liqueur whose color changes when you look toward the sun through a glass containing it.

The sweetbush, *Calycanthus fertilis*, Walt., is a three-to-four foot shrub that forms a rounded bush.

The leaves are ovate, lanceolate, pointed, quite entire, and smooth. The flowers, a little smaller than those of the preceding species, have upright red-brown petals.

FLOWERS: May until August.

RANGE: North America; acclimatized in our parks and used similarly to the one above.

CULTIVATION. These two shrubs get through the winter quite well in open ground in northern regions of France. They like free soil in good ground that is a bit cool; they do even better in heath compost. They are propagated by layers that take root with some difficulty. It takes them two years to put down roots. It's advisable not to lift them before the third year to be more certain that they'll take root when they're transplanted. It's always much better to place them in partial shade rather than in the open sun.

KEY TO PLATES.

499. Carolina allspice. 1. Flower opened longitudinally.
500. Sweetbush.

SPURGE OLIVE.

Family: TÉRÉBINTHACEAE [*Translator's note*: now assigned to the Cneoraceae family]
Reproductive system: TRIANDRY, MONOGYNY.

The spurge olive, *Cneorum tricoccum*, LINN., is a small ornamental bush that originated in the southern provinces of France. It grows three or four feet high. The stem is branched, cylindrical, and smooth. The leaves are alternate, elongated, widened at the tips and narrowed into petioles at their bases. The small yellow flowers are in the axils of the leaves and are borne on short peduncles. They have a three-pointed, persistent calyx; the corolla has three oval yellow petals. There are three stamens; the ovary is superior, crowned by a style that terminates in three stigmata. The fruit is a dry red berry made up of three husks, each containing a single seed.

FLOWERS: in June and July.

RANGE: southern France, in stony areas.

NOMENCLATURE. The genus name, *cneorum*, taken from the Greek verb *knein,* to provoke itching, indicates the caustic property and acridity of all parts of this plant. German, *der zeyland, zyndel*. English, *the widow-tail*. Spanish, *olivella*. Portuguese, *cito cacio*. Commonly, *l'olivier humble* [*Translator's note*: the humble olive tree].

USES. It keeps its foliage during the winter, which makes it suitable for decorating groves in that season.

The ancients used the leaves as a powerful purgative. But it's very acrid and caustic, so it's almost never taken internally any more. A decoction of the leaves is good for cleansing ulcerations.

CULTIVATION. The shrub grows and spreads naturally in the south of France. In the Paris region it's grown from seeds that are planted in a manure bed as soon as they're ripe, if you want them to sprout the following spring. When the seedling is ready to be transplanted, it's placed in loose soil in the shade. It should be covered during severe cold.

KEY TO PLATE.

1.Spurge olive. 2. Calyx. 3. Complete flower. 4. Stamens and pistil. 5. Capsule, transverse section.

TARTARIAN HONEYSUCKLE.

Family: CAPRIFOLIACEAE.
Reproductive system: PENTANDRY, MONOGYNY.

It's a pleasure to come across the Tartarian honeysuckle, *Lonicera tatarica*, LINN., in the first days of spring. Its cheerful and delicate green foliage is mingled with many pink flowers that have a very sweet fragrance. The stem grows five or six feet high. The branches are smooth. They have opposite leaves that are almost heart-shaped, pointed at the tips, wide at their bases, and quite similar those of the lilac but not as large. The solitary flowers are set in pairs on opposite peduncles in the axils of the leaves. They have two long, narrow bracts at their bases. The calyx is adherent, with five points. The smooth, funnel-shaped corolla is monopetalous, with five lobes of unequal size. The five slightly hairy stamens extend outside the tube. The ovary is topped with a style and a thickened stigma. The fruit consists of two berries with polyspermous compartments held together at their bases.

VARIETIES

First: Tartarian honeysuckle with pink flowers.
Second: Tartarian honeysuckle with white flowers.

FLOWERS: during March and April.

RANGE: Russia, Tartary. Cultivated in our gardens for a very long time.

NOMENCLATURE. Russian, *schimolost tatarskaja*. Tartar, *selpe, sebbe*. Kalmuk, *emogelsehin*.

USES. This bush makes a very pretty sight in gardens and groves of late spring and even in summer.

CULTIVATION: The seeds need a year or two to sprout. It's more advantageous to propagate the bush from layers that take root easily; these can be lifted after eighteen months for permanent planting. It won’t tolerate spring frosts, but harsh winters generally don't do it any harm. All soils are suitable; however, it's advisable to place it in a favorable location and in slightly warm earth.

KEY TO PLATE.

1. Tartarian honeysuckle. 2. Calyx and pistil. 3. Fruit consisting of two berries.

CAMPHOROSMA.

Family: CHENOPODIACEAE.
Reproductive system: TETRANDRY, MONOGYNY.

The camphorosma, *Camphorosma monspeliaca*, Linn., is a plant about a foot high. The stem is woody, branched, and hairy. The leaves are small, narrow, linear, pointed, and gathered in little bunches on the branches. Tiny whitish flowers are set in the axils of the leaves. The calyx is cup-shaped with four parts, the two larger ones alternating. The filaments of the four stamens are longer than the calyx. The simple style is divided at the top into two stigmata. The fruit is an oval capsule that contains a black, shiny seed.

FLOWERS: August and September.

RANGE: sandy regions of Provence, Languedoc, and the Bordeaux area.

NOMENCLATURE. *Camphorosma*, from the Latin *camphora*, or camphor, because the plant emits a strong smell of camphor. German, *die kampferpflance*. Dutch, *kamferkruid*. English, *the camphorosma*.

USES. This plant is little used in medicine, though sometimes it's given as an aperitive, a diuretic, and a sudorific. It's recommended for obstructions, dropsy, and menstrual deficiency. In the south it appears to be taken as an infusion in doses from a quarter to one ounce in a pint of water.

CULTIVATION. The camphorosma sometimes grows up to six feet in conservatories in the north of France, where it's kept protected from severe frost. It likes loose, sandy soil and good exposure in summertime. It's easily propagated from layers and

cuttings in all seasons. If this is done in the spring, they will root well after two months.

KEY TO PLATE.

746. Camphorosma. 1. Complete flower, natural size. 2. Same, enlarged.

CAPER.

Family: CAPPARIDACEAE.
Reproductive system: POLYANDRY, MONOGYNY.

The caper bush, *Capparis spinosa*, LINN., is grown as an ornamental in our gardens. In Provence it grows wild in stony areas and on old walls, where its vine branches spread out to the point where they sometimes cover the entire façade. The stem is cylindrical, smooth, and three or four feet long. The leaves are alternate, rounded, obtuse, smooth and green and are armed at their bases with two thorns in the form of stipules. The large solitary white flowers are on long peduncles set in the axils of the leaves. The deciduous calyx has four equal-sized concave sections. The corolla has four open petals rounded at the tips and narrowed at their bases. The very numerous purplish stamens are longer than the petals and are inserted into the receptacle. The superior ovary is on a long pedicel. It terminates in an obtuse sessile stigma. The fruit is a fleshy pediculate silique that contains several seeds.

FLOWERS: May and June.

RANGE: Provence, in the vicinities of Grasse and Toulon.

NOMENCLATURE. In Provence it's called *taperier*, from the Greek word *tapeinos*, meaning humble, not rising above the ground. German, *stachlichte kapern, gemeine kapern*. Dutch, *gedoornde kappers*. English, *the prickly caper bush*. Modern Greek, *rimoniaria*. Arabic, *lasaf*.

USES. The bark of the roots sometimes is used for treating diseases. The ancients considered it to be a powerful diuretic. It's an ingredient in several medications. The leaves are antiscorbutic.

The flower buds steeped in vinegar are called capers by cooks. In Provence they're gathered by hand wherever they're found. After they've been preserved in vinegar and in salt, they're sifted to separate them by size. The smallest capers are the best and the most highly regarded. The new fruits are also preserved; they're called caper pickles.

The caper bush in full bloom makes a very lovely sight.

CULTIVATION. It's propagated from seeds and by layering. But since it dislikes the cold, in northern France it's best to place it on an espalier. The safest way to layer the caper is to cover the stem with earth. The shoots that sprout right off the stem thus take root easily.

KEY TO PLATE.

1.Caper bush. 2. Calyx and pistil with one stamen showing its insertion.

AMERICAN BITTERSWEET.

Family: NERPRUNÉES [*Translator's note*: this species now belongs to the family Celastraceae].

Reproductive system: PENTANDRY, MONOGYNY.

The American bittersweet, *Celastrus scandens*, Linn., is a shrub that doesn't have tendrils but nevertheless attaches firmly to nearby trees and chokes them tightly enough to kill them. This made gardeners call it *bourreau des arbres* [*Translator's note*: the trees' executioner]. The leaves are alternate, smooth, oval, pointed at the tip, dentate, and petiolate. The small herbaceous flowers are in small terminal clusters. The calyx has five lobes. The five small petals are opposite the same number of stamens. The ovary is sunk into a disc and crowned by a style and three stigmata that are joined at the top. The fruit is a three-cornered capsule with three compartments and three valves, each partitioned in the center. Each compartment holds two seeds half surrounded by a tendril divided into four. The embryo lacks a perisperm.

FLOWERS: May and June

RANGE: Canada. Acclimatized for a long time in our parks and gardens.

NOMENCLATURE. *Celastrus*, from *Celastros*, the Greek name of a tree whose fruit ripens very late, believed to be the buckthorn. The name was assigned to the present genus because it's a member of the same family [*Translator's note*: currently, the genus *Celastrus* belongs to family Celastraceae, and the buckthorn to Rhamnaceae. Both belong to the order Celastrales]. German, *der baummorder*. Dutch, *klimmende celastrus*. English, *the climbing, staff tree*.

USES. It's grown in botanical gardens and in the parks of a few connoisseurs. The red fruit looks very attractive in autumn.

CULTIVATION. This shrub is very hardy. It thrives in almost all areas and in all exposures. It's easily propagated from seeds and layers.

There are several other known species of *Celastrus*. But they're almost all in

greenhouses or conservatories. None of them grow in Europe; they're all from America or from the Cape of Good Hope.

KEY TO PLATE.

591. American bittersweet. 1. Complete flower, enlarged. 2. Intact fruit. 3. Same, opened to show the seeds. 4. Same, without seeds. 5. Seed, taken out with its aril. 6. Same, stripped of its aril. 7. Embryo.

CHERRY.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, MONOGYNY.

The cherry tree genus, combined with that of the plum trees by Linnaeus, consists of about twenty species of trees or shrubs whose leaves are folded along the longitudinal vein before they develop. The white flowers are arranged in terminal spikes or in lateral clusters. The bell-shaped, five-lobed calyx is deciduous. The corolla has five petals. A large number of stamens insert into the calyx. The simple, superior ovary has a single style. It turns into a fruit with a smooth rounded pit, marked on its side with a slightly projecting edge, and containing one or two seeds.

The wild cherry tree, *Cerasus avium, Prunus avium*, Linn., is a tree about thirty-six feet tall. The trunk is covered with smooth, whitish bark. The leaves are large, green above, whitish and slightly downy underneath, with toothed edges. In the wild species, the fruit is ovoid, dark purple when ripe, with a bitter taste. Some growers think of it as the standard for all of the cultivated varieties of cherries.

FLOWERS: April and May.

RANGE: The ancient forests of France and of other parts of Europe.

NOMENCLATURE. German, *wilde kirschbaum, zwifelbeere*. English, *black-cherry, mazzard.* Italian, *visciolo*. Spanish, *cerezo de la sierra*. Russian, *wischna*.

USES. Wild cherries have several commercial uses. Kirsch is a liqueur obtained by distillation after fermenting them into a wine. They're an ingredient in Grenoble ratafia and in several other liqueurs. Wild cherry brandy is prescribed medically for nervous, convulsive, and epileptic conditions, as well as for apoplexy, paralysis, and malignant fevers accompanied by sudden spasms of the tendons.

Wild cherry wood is highly valued for cabinetry. It's used to make tables, bedsteads, etc. It's one of our most beautiful native woods.

The mahaleb cherry tree, *Cerasus mahaleb, Prunus mahaleb*, Linn., is an approximately twenty-foot high tree with grayish bark. The leaves are rounded-oval, smooth, with small teeth on the edges. The flowers are arranged six or eight together in loose clusters spread along the branches. They are replaced by a small oval-rounded fruit with a bitter, unpleasant taste.

FLOWERS: May and June.

RANGE: The forests of France and of a part of Europe.

NOMENCLATURE. Commonly called *quénot malagué*, *de bois de Sainte-Lucie* because it grows abundantly in Sainte-Lucie, in Lorraine. German, *wohlriechende kirchestein weichel*. English, *perfumed cherry*. Spanish, *Pao San Gregorio*.

USES. The lathe-workers and carpenters of Sainte-Lucie use the wood a lot. They make small pieces of furniture out of it that have a very long-lasting, pleasant aroma.

In earlier times the pits of the fruit were believed to be able to dissolve bladder stones [*Translator's note*: an affliction formerly seen in Europe but now more prevalent in developing countries]. But it seems that this property was imaginary. The wood of the mahaleb cherry tree is thought to be a sudorific, but it's not used medicinally. Bauhin says that blackbirds and thrushes greatly relish its fruit.

The bird cherry, *Cerasus padus, Prunus padus*, Linn., is a large shrub that grows about twelve feet high. The vivid green leaves are alternate, oval-lanceolate, and smooth with saw-tooth edges. The large numbers of white flowers are arranged in slightly pendent clusters that are longer than the leaves. The small, round, black fruit has a bitter, unpleasant taste.

FLOWERS: in May. It grows wild in the forests of France.

NOMENCLATURE. *Padus*, from a Greek word used by Theophrastus to denote a tree similar to the cherry tree. Commonly, *putiet, merisier à grappes, faux bois de Sainte-Lucie* [*Translator's note*: stinktree, flowering wild cherry tree, false Sainte-Lucie tree]. German, *traubenkirsche faulbeere*. English, *common birdcherry tree*. Italian, *pado*.

Russian, *tscheremucha*. Tartar, *gumurut, mojel*. Kalmuk, *moisun*.

USES. The bark of the bird cherry branches is bitter and astringent. It had been tried out in place of cinchona for treating intermittent fevers, but it seems not to have been successful as a febrifuge, so it's not used medicinally. In Germany some country folk wear the fruit in amulets in the belief that it can cure or ward off epilepsy.

The Portugal laurel, *Cerasus azarero, Prunus azarero*, Linn., is an evergreen shrub that grows about fifteen feet high. It takes on a bushy appearance, very densely covered with limbs and branches. The leaves, a beautiful green, are alternate, petiolate, oval-lanceolate, pointed, and dentate. The white flowers are in upright clusters. The fruit, green at first, becomes a deep violet-purple when it ripens.

FLOWERS: June and July.

RANGE: Portugal; acclimatized in almost all of France.

NOMENCLATURE. Commonly, *l'azarero, le laurier de Portugal* [*Translator's note*: azarero, Portuguese laurel]. German, *portugisische kirsche*. English, *Portugal laurel*. Spanish, *loro*. Portuguese, *azareiro, azareira*.

USES. This shrub deserves a place in winter groves where its bright evergreen foliage creates a fine appearance. It's never harmed by cold.

The Bigarreau cherry tree, *Cerasus duracina, decand. Prunus cerasus*, Linn., is a tall tree with upright branches that several authorities believe to be a variety of wild cherry. The leaves are large, dentate, and pendent. Five or six flowers emerge together from the same bud. The fruit is full, firm, and heart-shaped, with a longitudinal crease along one side.

FLOWERS: April and May. It doesn't grow wild; it's obtained by grafting.

USES. Everyone is familiar with the high quality of the fruit. There are several cultivated varieties.

The principal ones that I've observed in the nurseries of the Luxembourg Garden are: (1) the Holland Bigarreau - beautiful, and good fruit. (2) the Princess Bigarreau - smaller than the preceding but excellent. (3) the red fruit Bigarreau - beautiful and good fruit. (4) the full-fruit bigarreau from Russia - good fruit. (5) the common Bigarreau.

CULTIVATION. Fruiting cherry trees are propagated by grafting onto the wild cherry for trees in the open air, and onto the mahaleb for trees with lower trunks. The latter are less productive but can adapt to all areas. In general, cherry trees like warmth and loose, deep soil. They suffer in cold, wet, dense earth. The Portugal laurel is easily propagated from seeds planted as soon as they are fully ripe and the pulp has completely dried out. They are put in wooden boxes or in pots, or even planted in open ground. In the latter instance, they have to be protected from field mice, which are very fond of them. They adapt well to all areas, but they thrive best in good soil. Partial shade suits them better than too southern an exposure.

KEY TO PLATES.

512. Wild cherry tree. 1. Branch with leaves. 2. Same, in bloom. 3. Complete flower, opened.

513. Mahaleb cherry tree. 1. Calyx. 2. Complete flower, opened. 3. Fruit. 4. Same, transverse section. 5. Naked seed.

514. Bird cherry tree. 1. Complete flower, opened. 2. Fruit. 3. Same, transverse section. 4. Seed.

515. Portugal laurel shrub. 1. Complete seed. 2. Same, cut open transversally. 3. Lobes of embryo.

516. Bigarreau cherry tree. 1. Flowering branch. 2.Open flower. 3. Fruit.

CHERRY LAUREL.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, MONOGYNY.

Two or three leaves of the cherry laurel tree, *Prunus laurocerasus*, LINN., added to milk give it a very pleasant almond flavor. But it's best not to leave them in too long because that will make it unhealthful. The experiments of Duhamel and Mortimer [*Translator's note*: possibly John Mortimer, 1656-1736, English horticulturist] on dogs clearly demonstrated that the juice and the distilled liqueur of the cherry laurel are a deadly poison for humans and animals. [*Translator's note*: two toxic glucosides, prulaurasin and prunasin, have been isolated from the cherry laurel.]

This tree grows fifteen or twenty feet high. It takes on a very beautiful shape and tolerates pruning. The young branches are a yellowish color. They are upright and firm. The large oval leaves are alternate, lanceolate, dentate, leathery, smooth and green above, and yellowish-green underneath. They have two glands at the base of their inferior vein. The white flowers, set in the axils of the leaves, form upright clusters. The calyx is a single unit with five lobes at the top. Five rounded petals form the corolla. A large number of stamens insert into the calyx. The ovary is free, crowned with a style and a stigma. The fruit is a black berry when ripe.

FLOWERS: April and May.

RANGE: The vicinity of Trébizonde. It was brought to Europe in the sixteenth century. Belon [*Translator's note*: Pierre Belon du Mons, 1517-1564, French naturalist] claims to have seen one of the trees at that time in Prince Doria's garden in Genoa.

USES. Its pleasant evergreen foliage enhances the beauty of our groves. Around Paris it has to be covered in winter, but it's quite successful in the interior of France. I've seen some very vigorous trees in Normandy and in Brittany.

CULTIVATION. It's easily propagated from seeds, suckers, and layers. Duhamel claims that he tried unsuccessfully to graft a cherry tree onto the cherry laurel.

KEY TO PLATE.

1. Cherry laurel in bloom. 2. Open calyx, stamens, and pistil. 3. Complete flower.

RUSSIAN OLIVE.

Family: ELEAGNACEAE.
Reproductive system: TETRANDRY, MONOGYNY.

The Russian olive, *Eleagnus angustifolia*, LINN., is a tree about thirty feet high. Its leaves, lanceolate and entire, are whitish, which gave it the name Bohemian olive tree. The flowers appear solitary or in pairs at the axils of the leaves. They are borne on branches and peduncles covered with silvery-white scales. The bell-shaped calyx, yellow inside and whitish outside, has four lobes. The four sessile stamens insert into the inside of the base of the divisions of the calyx. The superior ovary, crowned by a style, turns into a drupe containing a monospermous pit.

FLOWERS: June and July.

RANGE: humid areas in Provence and Piedmont.

NOMENCLATURE. *Eleagnus*, from a Greek word that recalls its resemblance to the olive tree. German, *wilde oelbaum*. Danish, *vilde oljetrae*. English, *the oleaster*. Spanish, *arbol de paraiso*. Russian, *lochowina, loch*. Polish, *oliwa lesna polua*. Bohemian, *plana oljwa*. Persian, *kalaf*.

USES. The tree is cultivated in parks and in large gardens. The whiteness of its foliage makes an attractive sight among the greenery of the other trees. The wood is only good for fuel. When the tree blooms, it gives off a very strong aroma that goes to the heads of sensitive individuals.

CULTIVATION. It's propagated by layering and by cuttings performed in spring and autumn. In northern France,

the cuttings must be sheltered during winter. The tree thrives quite well in all locations, but it prefers loose, sandy soil. It's sometimes harmed by severe cold.

KEY TO PLATE.

[*numbering in key corrected by translator*.]

Russian olive. 1. Flowering branch 2. Open calyx, stamens, and pistil.

PERFOLIATE HONEYSUCKLE.

Family: CAPRIFOLIACEAE.
Reproductive system: PENTANDRY, MONOGYNY.

The stem of the perfoliate honeysuckle, *Lonicera caprifolium,* LINN., forms a rough, grayish stock. It puts out a number of extremely long cylindrical shoots, leafy and densely branched, that wind all around the structures supporting it. The leaves, opposite in pairs, are sessile, oval, obtuse, and quite entire. The ones on the upper parts of the branches are fused together as a single rounded leaf traversed by the stem. The large reddish flowers are sessile and arranged in whorls at the base of the uppermost two or three pairs of leaves. The very small calyx is persistent, with five points. The corolla is a long tube widened at the top and divided into two parts. The upper part is broad, with four lobes; the lower is narrow, entire, and reflexed. There are five stamens. The ovary is adherent and topped by a thin style the same length as the corolla. The fruit is a red berry containing several seeds.

FLOWERS: from the end of spring until mid-summer.

RANGE: southern France, in woods and hedges.

NOMENCLATURE. German, *das geisblatt, welsche specklilie*. English, *the italian honeysuckle*. Spanish, *madre selva*. Portuguese, *matrisylva*. Provençal, *mairesiouvo*.

USES. This honeysuckle has been an ornamental shrub in our parks and gardens for a long time. Early in summer it's seen climbing up large trees and descending in elegant flowery garlands. It’s used to cover walls and fences and to form bowers and arbors. All of its formations are pleasing, and it delightfully enhances a garden's appearance and fragrance.

It's best not to let it climb on evergreens because it will spoil their appearance during the several months of the year when it has shed its leaves.

CULTIVATION. The plant does well in all soils and locations, but according to some growers, much better in full sunshine than in shade. It's propagated at any time by layers that root in a few days when they're in good soil. It forms roots so easily that branches that are left to creep on the ground in summer will have lots of roots by autumn, and they can be separated and transplanted.

KEY TO PLATE.

1. Calyx, corolla, and stamens. 2. Calyx, enlarged. 3. Fruit, enlarged. 4. Same, cut in two.

HONEYSUCKLE.

Family: CAPRIFOLIACEAE.
Reproductive system: PENTANDRY, MONOGYNY.

The Alpine honeysuckle, *Lonicera alpigena*, Linn., is a three or four-foot bushy shrub. The branches are thick and have large, entire, oval-lanceolate, opposite leaves. The reddish flowers are joined two-by-two on long peduncles. The irregular corolla has five stamens. The ovary is adherent. The fruit is a berry formed by the fusion of two calices. It has two compartments. One usually fails to develop; the other contains two seeds.

FLOWERS: in May.

RANGE: the Alps.

The Pyrenean honeysuckle, *Lonicera pyrenaica*, Linn., is a three- or four-foot shrub. The leaves are opposite, entire, oval-oblong, blue-green and are on somewhat thick branches that are reddish on one side. The paired flowers are pendent. The monopetalous corolla is almost regular, with five stamens inserted near the middle of the tube. The fruit consists of two individual red berries.

FLOWERS: in May

RANGE: the Pyrenees and the mountains of Provence.

The trumpet honeysuckle, *Lonicera sempervirens*, Linn., is a shrub with a climbing stem. The upper leaves are rounded, joined, and perfoliate. The lower ones, oval and entire, have short petioles. The flowers, on a terminal spike, are a beautiful red on the outside and yellow inside. The corolla with five almost regular lobes has a bulge in the upper part of its tube.

FLOWERS: from May until August.

RANGE: North America; cultivated in our gardens.

USES. These bushes add ornamentation to gardens. The pliant stems of the trumpet honeysuckle, as well as the vivid color of their corollas, make them well suited for fashioning garlands on arbors and for covering walls in parks and gardens that one wants to beautify. The other species emit a pleasant fragrance and deserve to be cultivated as well.

CULTIVATION. They are propagated easily by layering at any time, and almost all soils are suitable for them.

KEY TO PLATES.

Alpine honeysuckle. 1. Leaf, natural size, and fruit. 2. Open corolla, stamens, and pistil. 3. Berry, transverse section. 4. Seed.

Pyrenean honeysuckle. 1. Open corolla, enlarged, stamens, and pistil.

Trumpet honeysuckle. 1. Open corolla, stamens, and pistil.

WHITE-LEAVED ROCKROSE

Family: CISTACEAE.
Reproductive system: POLYANDRY, MONOGYNY.

The white-leaved rockrose, *Cistus albidus*, LINN., is found on the arid hills of Provence and Languedoc. Its large, prettily colored flowers create the finest impression in our parterres. The stem, three or four feet high, bears several branches and forms a leafy bush. The branches are covered with a cottony down. The sessile, oval-oblong leaves are opposite and marked underneath by slightly protruding veins. The large, purple flowers are terminal. The calyx has five hairy divisions rounded at their bases and culminating in points that are bent back at the tips. The corolla has five large obtuse petals of a beautiful purple color. A very large number of stamens insert into the base of the ovary, which is simple and surmounted by a style with a stigma rounded at the top. The fruit is an oval-rounded capsule with five compartments and five valves that open in the middle of each compartment. There are numerous seeds that insert into the edges, without any receptacle.

FLOWERS: in June and July.

RANGE: the vicinities of Nice, Narbonne, Montpellier, and several other parts of southern France.

NOMENCLATURE. *Cistus*, from the Greek word *kistos*, the name for these plants. German, *das weisslichte cistenrochen*. Spanish, *estepilla, bullegra*. Portuguese, *rosalho*.

USES. The flowers stay open only a short time, but for two or three months there are so many of them that one hardly has a chance to notice how briefly they last. They decorate flower beds in the south of France, and add variety to conservatories in the northern provinces.

CULTIVATION. In the north of France you can try to leave the plant in open ground, giving it a southern exposure and average soil, but several specimens ought to be retained in a conservatory. It's propagated by planting the seeds in April in pots or in a tray in compost. When the seedlings have five or six leaves, they are transplanted separately into very small pots placed in the shade, or in a shaded compost bed, so that they can take root. They also can be propagated from cuttings, which must be done in the summer. They will take root after six weeks.

KEY TO PLATE.

1. White-leaved rockrose. 2. Calyx and stamens. 3. Pistil with several stamens to show their insertion. 4. Whole fruit. 5. Same, transverse section.

ROCKROSE.

Family: CISTACEAE.
Reproductive system**:** POLYANDRY, MONOGYNY.

Rockroses make a lovely sight in the French countryside and in southern Europe, where they grow in the wild. The flowers are short-lived, but they continue blooming in such abundance for several months that it's a pity that in the north they can't be grown out in the open.

THE LAUREL ROCKROSE. *Cistus laurifolius*, Linn. is a shrub about two meters high. The leaves are oval, lanceolate, pointed, smooth above and hairy underneath. They appear to be joined at their bases. The white flowers are terminal and are clustered together on quite long, bare peduncles. The calyx has five equal sections.

FLOWERS: in June and July.

RANGE: the south of France.

NOMENCLATURE. Spanish, *estepa*. Basque*, estepa*.

GUM ROCKROSE. *Cistus ladaniferus*, Linn. is a shrub similar to the one above, but its leaves are narrower and more pointed. The corolla is larger, white, and usually has a violet spot at the base of each petal. The calyx has five equal sections. The fruit is a capsule with ten compartments.

FLOWERS: in June and July.

RANGE: the south of France.

NOMENCLATURE. German, *spanische ladanum-cisten*. Spanish, *jara, xara*. Portuguese, *estevao*.

USES. In the Aegean islands, the gum rockrose is one of the trees that provide labdanum, a gummy, resinous extract used medically as an astringent, a decongestant, and for healing wounds. The Greeks and the Circassians used it as very good protection against malaria and even against plague.

These two shrubs can be used as ornamentals in conservatories in the north of France. In Provence, they thrive in open ground.

CULTIVATION. The plants can be propagated from seeds, but since these often don't ripen in the north of France, they have to be propagated from cuttings during the summer. They take root at the end of six weeks. Rockroses kept in a conservatory require little care. Free sandy soil with a little watering in winter is sufficient. When the cold weather isn't severe, one can take a chance on leaving them out in the open.

CLEMATIS.

Family: RANUNCULACEAE.
Reproductive system: POLYANDRY, POLYGYNY.

There are more than thirty species of clematis. Seven or eight of them grow wild in France or have been acclimatized in our gardens. The stem of the blue clematis, *Clematis viticella*, LINN., is a slender, climbing, branching vine. The compound leaves consist of several oval-pointed entire leaflets, sometimes with one or two lobes. The corolla of the blue-purple flower has four petals. There are a large number of stamens. The ovaries turn into as many flattened seeds and join to form a fruit that lacks the tuft or silky fibers found in the other species.

The fern-leaved clematis, *Clematis calycina*, HORT. K. [*Translator's note*: now *C. balearica*], blooms during part of the winter if it's planted where it's sheltered from the north wind. It originated in Mahón [*Translator's note*: a harbor town on the Balearic island of Minorca]. The stem is made up of vines that climb up over six feet; they have opposite leaves composed of laciniate leaflets. The corolla, with an involucre, has four yellowish oblong elliptical petals. The seeds have silvery silky fibers on them.

The traveler's-joy, or viburnum, beggar's plant [*Translator's note*: the latter two common names also refer to plants of a different genus], *Clematis vitalba*, LINN., has a crooked stem and puts out vine-shoots three feet long. The leaves are opposite, winged, and consist of three heart-shaped, pointed leaflets, sharply toothed on their edges. The corolla has four, slightly leathery oblong divisions. There are very many stamens. The seeds make a remarkable impression with their tufts or white, silky plumes that last through part of the winter.

FLOWERS: July and August, along the hedgerows of France.

NOMENCLATURE. German, *gemeine waldrebe, bind-weide*.

English, *common virgin's bower, traveller's joy*. Spanish, *hierba de pordioseros*.

The oriental clematis, *Clematis orientalis*, LINN., is a shrub discovered by Tournefort on his voyage to the Levant. It makes a most suitable covering for arbors. The compound leaves consist of blue-green leaflets that are pointed, bent, and often lobed. The yellowish flowers are arranged in panicles. The corolla has four lanceolate divisions; there are large numbers of stamens and ovaries. They are replaced by feathery, whitish capsules.

FLOWERS: from June until October.

NOMENCLATURE. *Clematis,* from a Greek word that means leafy vine-branch, because the stems of clematises climb and spread out like vines.

USES. Almost all of the clematises are grown as ornamentals for gardens. They decorate old walls, palisades, and trellises. The traveler's-joy is caustic and corrosive; its leaves, when crushed and applied to the skin, cause inflammation. That's why certain beggars use them for inducing ulcerations to arouse sympathy. But they cure themselves easily by applying chard leaves. This type of clematis would be extremely hazardous if taken internally.

CULTIVATION. Clematises are propagated by planting seeds as well as by layering and by dividing the plants.

KEY TO PLATES.

1. Blue clematis. 2. Stamens and ovaries. 3. Separated ovaries. 4. Intact fruit. 5. Detached seed.

1. Fern-leaved clematis. 2. Complete flower. 3. Stamens.

1. Traveler's-joy. 2. Fruit.

1. Oriental clematis. 2. Stamens and pistil. 3. Fruit.

CUP-AND-SAUCER VINE.

Family: POLEMONIACEAE.
Reproductive system: PENTANDRY, MONOGYNY.

The climbing cup-and-saucer vine [*Translator's note*: also called cathedral bells], *Cobæa scandens,* Cavan., is a plant remarkable for its energetic growth. It proves to us that plants from the hottest countries can succeed in our climate when knowledgeable growers are in charge of acclimatizing them. After first keeping it in the warmest greenhouses of the King's Garden, M. Thouin planted the seeds, raised the seedlings in a temperate greenhouse, and then transferred them to a conservatory. Today it is grown in open ground, though the stems die at the end of autumn. Yet there is every reason to believe that in the end it will be completely protected from the cold of the Paris climate. It's already been kept successfully in certain sheltered locations, and it's no longer harmed by winter in our southern provinces.

The stems are woody, sarmentose, smooth and delicate. They reach a length of thirty or forty meters. The leaves, borne on short petioles, are alternate, oval-oblong, smooth, quite entire, and pinnate, consisting of three pairs of leaflets. The petiole terminates in a tendril that branches at the end. The flowers are at first a pale yellow but then become violet, sometimes greenish, especially at the end of autumn. The calyx is a single unit with five divisions and five flattened corners and winged at their bases. The monopetalous, bell-shaped corolla is divided into five parts along its border. There are five stamens. The five filaments, swollen and hairy at the bottom, insert into the base of the corolla and terminate in oblong anthers. The superior ovary is surrounded at its base by a pentagonal glandular structure. The style is longer than the stamens and terminates in three stigmata. The fruit is an acuminate oval capsule with three or five compartments and contains several overlapping seeds.

FLOWERS: August and September.

RANGE: Mexico, brought thence to Madrid. From there it came to Paris around 1806 and has spread into almost all of France.

NOMENCLATURE. *Cobæa*, the name given to the plant by Cavanilles [*Translator's note*: Antonio José Cavanilles, 1745-1804, a Spanish botanist, taxonomist, and plant collector] in memory of Barnabé Cobo, a Spanish Jesuit who wrote on natural history around the middle of the seventeenth century.

USES. This is one of the most beautiful plants that can be grown for decorating gardens, covering arbors, and providing shade. Its abundant flowers create a most beautiful appearance.

CULTIVATION. The plant likes good, substantial soil and frequent watering during the period of its most active growth. It's propagated by seeds planted on a compost bed, as well as by layers that take root easily, and by cuttings.

KEY TO PLATE.

601. Cup-and-saucer vine. 1. Lower portion of the corolla and stamens. 2. Ovary. 3. Transverse section of fruit to show the seeds.

QUINCE.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, PENTAGYNY.

The common quince tree, *Cydonia sativa, Pyrus cydonia*, Linn., [Translator's note: now *Cydonia oblonga*] is a tree about fifteen or twenty feet high, frequently with a twisted trunk. The new branches are covered with a cottony down. The large leaves are oval, soft, quite entire, green on top and white and cottony underneath. The large, slightly pinkish, white flowers are solitary in the axils of the upper leaves. The calyx has five sections and the corolla five petals. The numerous stamens insert in the calyx. The ovary is adherent; it turns into a yellow, cottony, turbinate fruit divided inside into five compartments containing several cartilaginous seeds.

FLOWERS: in May.

RANGE: the southern provinces of France and Europe.

NOMENCLATURE. *Cydonia*, from Cydon, now Khaniá, in Crete, where it was originally grown [*Translator's note*: the tree now is thought to have originated in western Asia and was introduced into Crete around the seventh century B.C.E.]. German, *der quittenbaum, die quite*. Dutch, *kweeboom*. English, *the quince-tree*. Italian, *cotogno*. Spanish, *membrillero*. Russian, *armud*. Polish, *pigwa*. Hungarian, *birs-alma*.

USES. The fruit of the quince tree is acidic, bitter, and astringent. Preserves and a jelly called *cotignac* are made from it. Its odor is so strong and penetrating that when it begins to ripen it must be kept far from dwellings.

Extract of quince and other preparations of the fruit are used medicinally for diarrhea, which is known to be caused by infirmity of the digestive organs. A decoction of the seeds yields a mucilage that sometimes is used externally for inflammatory ophthalmias. Quince syrup is used in absinthe and in the electuary *diaprun* [*Translator's note*: a soothing medicated paste].

CULTIVATION. The quince tree is propagated using seeds from the fruit, and from shoots and cuttings. The former are preferable for growing stocks for grafting pear trees. They are planted just like those of apples and pears. The seedlings are grown in a nursery and are grafted when the stems are strong enough. It's essential in a garden to have several free quince and pear trees, grafted or not. They're used to compensate for pear trees that are lost and to propagate the best fruit and trees that grow best in the place where one lives.

KEY TO PLATE.

581. Common quince. 1. Calyx split longitudinally, stamens, and pistils. 2. Fruit, half natural size.

DOGWOOD.

Family: CAPRIFOLIACEAE. [*Translator's note*: the genus Cornus now is assigned to the Cornaceae family.]

Reproductive system: TETRANDRY, MONOGYNY.

The cornelian cherry tree, *Cornus mascula*, Linn., [*Translator's note*: now *Cornus mas*] is a tree that rises fifteen or twenty feet on a straight trunk. The leaves, on short petioles, are opposite, oval, entire, and supplied with parallel veins. The flowers bloom before the leaves come out; they form a sort of yellow umbel that emerges from buds on the trunk and on the branches. The calyx has four points, the corolla four petals. Four stamens alternate with the petals. The fruit is a red or yellow ovoid drupe; it contains a pit with two compartments and two seeds.

FLOWERS: in February.

RANGE: France and a part of Europe.

NOMENCLATURE. *Cornus* from *cornu*, a horn, because the hardness of its wood was highly reputed among the ancients for making darts, pikes, etc.

Conjecto sternit jaculo, volat itala cornus. VIRG.

[*Translator's note*: …hurling the javelin, he struck him down – the Italian cornel flew through the air…

(Aeneid, IX, 698).]

Colloquial French, *le cornier, l'acornier*. German, *der kornelbaum, korle*. English, *the cornelian cherry*. Italian, *il corniolo*. Russian, *der*. Polish, *deren*. Persian, *sochal*.

USES. Cornelian cherry wood is widely used in the manufacture of handles for tools and of cogs and spokes for wheels. The fruit is eaten raw or preserved in salt or sugar; it's a healthy and enjoyable food. According to Theophrastus, the ancients had noticed that the fruit of wild cornelian cherry trees tasted better than that of the cultivated ones.

The European red dogwood, *Cornus sanguinea*, Linn., is a tree that grows about fifteen or twenty feet high. The bark on its branches is red and smooth, which gave it the name blood-colored. The leaves, on short petioles, are opposite, entire, oval, pointed,

and have rather prominent veins. The white flowers bloom after the leaves. They are arranged in umbels with branching stalks. The corolla has four petals and four stamens. The ovary turns into a blackish berry when ripe.

FLOWERS: in June.

RANGE: France, in hedgerows.

NOMENCLATURE. Colloquial French, *le sanguin, le bois punais, la sanguine* [*Translator's note*: blood-red tree, stinkwood.] German, *der hartriegel, hartreder*. English, *the common dogweed, dog berry tree*. Italian, *il sanguine*. Russian, *sljepokurnik*. Hungarian, *giuru-fa*.

USES. The wood of this tree is knotty and hard; it's often used by lathe workers. The berries are bitter and acrid. After boiling in water, they can be pressed to obtain fuel oil for lamps.

CULTIVATION. Dogwood trees are very hardy. They are propagated mostly from shoots that they put out abundantly. These are pulled up in the autumn for permanent planting.

KEY TO PLATES.

685. Cornelian cherry tree in bloom. 1. Same, with fruit. 2. Complete flower, enlarged.

686. European red dogwood. 1. Flower. 2. Same, opened up. 3. Fruits.

LABURNUM.

Family: LEGUMINOSAE.
Reproductive system: DIADELPHY, DECANDRY.

The Alpine laburnum, *Cytisus laburnum*, Linn. [*Translator's note*: now *Laburnum alpinum* or *Cytisus alpinus*] is a large tree whose beautiful clusters of yellow flowers adorn our parks and large gardens at the beginning of May. The trunk grows four or five meters high; it is uniform and slightly greenish. The branches are long and pendent. The compound leaves have three leaflets, oval-oblong, hairy underneath, on long petioles. The pendent flowers are located at the ends of the branches; they turn into slightly hairy pods. A cultivated variety has smooth leaves and pods; its branches are firmer and are not pendent.

FLOWERS: May and June.

RANGE: Rocky regions of the Basses-Alpes and the Jura, the hills of Burgundy and Bresse.

NOMENCLATURE. *Cytisus*, a name given by the ancients to a tree that doesn't belong to this genus. Colloquial French, *l'aubours, le faux ébenier, le cytise à grappes* [*Translator's note:* laburnum, false ebony, clustering cytisus]. German, *der bohnenbaum, der linsenbaum*. Portuguese, *codeço dos Alpes*.

The sessile-leafed cytisus, *Cytisus sessilifolius*, Linn., is a shrub a meter or two high. It is upright, densely branched, and completely smooth. The leaves consist of three rounded leaflets that end in a point. They are sessile on the upper branches. The yellow flowers, three to five together, are on peduncles at the ends of the branches. The calyx at its base has a floral leaf consisting of two or three leaflets. The fruit is a smooth oblong pod containing five to seven blackish seeds.

FLOWERS: May and June.

RANGE: Provence and Languedoc, near Montpellier.

NOMENCLATURE. Colloquial French, *le trifolium des jardiniers* [*Translator's note*: the gardener's trifolium]. German, *der garten-cytisus*. English, *the common cytisus*.

The hairy broom, *Cytisus hirsutus*, Linn., is a low shrub that grows wide and bushy, full of stems and branches. The leaves, on petioles, are alternate, very hairy and are made up of three oval leaflets. The yellow flowers form a terminal head. The calyx is hairy, as is all the rest of the plant.

FLOWERS: July.

RANGE: southern Europe.

USES. These three species of cytisus have been used ornamentally in parks and gardens for a long time. The first one especially is quite delightful. M. Dumont-Courset says that its variety seems even more beautiful. It's quite erect, it forms a broad top, and the flowers are upright. It could be thought of as a separate species. By combining these trees with Persian lilacs, Judas-trees, and double-flowered cherry trees, you will have in the springtime the best-looking and most enjoyable grove.

CULTIVATION. These shrubs are very hardy. They are propagated by seeds planted in trays or in flower beds. After the young cytisus seedlings have sprouted, they have to remain in their seed-plots until the beginning of the following spring so that they can be planted in a nursery.

KEY TO PLATES.

592. Alpine laburnum. 1. Calyx and stamens. 2. Seed pod.
593. Sessile-leafed cytisus. 1. Calyx and stamens.
594. Hairy broom. 1. Open calyx and stamens.

DAPHNE.

Family: DAPHNACEAE [*Translator's note:* now in family Thymelaeaceae].
Reproductive system: OCTANDRY, MONOGYNY.

The alpine daphne, *Daphne alpina,* LINN., is a mountain shrub in our region with a stem three feet high. The leaves are alternate, oval-oblong, pale green, and downy underneath when they're new. The flowers are small, whitish, rather unremarkable, and are situated at the axils of the leaves. The calyx is tubular, with four lobes. The eight stamens are sessile and are arranged in two rows within the tube of the calyx. The ovary is free and surmounted by a short style. The fruit is a berry with one compartment and a single seed.

FLOWERS: in May and June.

RANGE: in Dauphiné, in clefts in rocks.

The mezereon, *Daphne mezereum,* LINN., is a shrub covered with pink flowers at winter's end when the rest of nature is still completely bare. Its stem, about three feet high, is branched and covered with brown bark. The leaves develop only after the flowers have begun to fade; they're oval-lanceolate, entire, and alternate. The flowers, pink or white in color, are sessile and form clusters along the branches. The calicinal envelope and the corolla seem to be fused; they form a tube at the base and four lobes at the top. The eight stamens are arranged in two rows contained inside the tube. The ovary is free; it's crowned by a simple stigma. The fruit is a red berry when ripe.

RANGE: the mountain woodlands of France.

NOMENCLATURE. *Daphne,* the Greek word for laurel,

recalls Apollo's love for the daughter of the Piniós river [*Translator's note*: the river flows through the valley of Tempe in Thessaly between Ossa and Olympus. In the myth, the nymph Daphne, a daughter of the river, was pursued by Apollo. She loved another and escaped, and a laurel tree was left in her place. The genus of the tree described here was named *Daphne* by Tournefort in the 18th century because the foliage of some of its species resembles that of the laurel tree (genus *Laurus*)]. German, *kellerhals.* Dutch, *peper boomje*. English, *common spurge olim*. Russian, *woltschje luko*. Polish, *wylcze liko*. Hungarian, *farkas hars*. Commonly, *bois joli, malherbe.*

USES. The mezereon embellishes gardens and parterres in early spring. The fragrance of its flowers is pleasant but dangerous to inhale for a long time, especially at night in a closed room.

The bark, leaves, and fruit of this shrub are very bitter. The bark sometimes is used to make setons, and three or four of its fruits make a powerful purgative. Russel [*Translator's note:* possibly Alexander Russell, 1715-1768, Scottish physician and naturalist] claims that he has used a decoction of the bark to treat long-term and refractory syphilitic diseases.

CULTIVATION. These two shrubs are propagated by layering, but more often by seed planting in open ground. The seeds are scattered or sown in furrows and covered with a couple of inches of soil. These shrubs prefer loose soil and slightly shaded locations.

KEY TO PLATES.

1. Alpine daphne 2. Complete flower. 3. Open calyx, stamens, and pistil.

1. Mezereon. 2. Open calyx and stamens. 3. Pistil. 4. Fruit.

DIERVILLA.

Family: CAPRIFOLIACEAE.
Reproductive system: PENTANDRY, MONOGYNY.

The yellow-flowered diervilla, *Diervilla lutea*, Desf., *Lonicera diervilla*, Linn., is a small bushy tree brought from Acadia and grown here in open ground for about a century. The stem is about two or three feet high, reddish, and grooved. The leaves are smooth, oval, pointed, have dentate margins, and are held on short petioles. The yellow flowers are clustered in small, loose, and not very full bunches at the tops of the stems. The calyx is oblong; the upper part is narrow and terminates in five sharp teeth. It has two bracts at the base. The corolla is monopetalous, funnel-shaped, with five lobes. Five stamens insert at the base. The ovary is adherent, surmounted with a style and a stigma on top. It turns into a pointed capsule with four compartments containing many very small seeds.

FLOWERS: in June.

RANGE: Acadia. It was brought from there at the beginning of the last century.

NOMENCLATURE. *Diervilla*, from Dierville, the name of the surgeon who brought it here from Acadia and introduced it into our gardens.

Tournefort described this shrub in the Proceedings of the Academy of Sciences in the year 1705 and named it *diervilla.* Linnaeus linked the genus to *lonicera* and named it *lonicera diervilla.* German, *die akadische lonizere.* English, *the yellon flowered repright honey-suckle*[*Translator's note*: probably *yellow-flowered upright honeysuckle*].

USES. This shrub adds decoration and variety to pleasure gardens.

CULTIVATION. The diervilla is very hardy. It's readily propagated from the plentiful shoots that grow from it. When it's in

good soil, it takes up quite a lot of space. It adapts well to all locations and to all types of soil.

KEY TO PLATE.

Yellow-flowered diervilla. 1. Calyx and pistil. 2. Open corolla and stamens.

PHILLYREA.

Family: JASMINES [*Translator's note*: *Phillyrea* now classified in the family Oleaceae].

Reproductive system: DIANDRY, MONOGYNY.

The broad-leaved phillyrea, *Phillyrea latifolia,* Linn., is a medium-sized, very branchy tree with ash-colored bark. The leaves are oval, smooth, with serrate margins, or oval-oblong, pointed, slightly serrated on the margins, or oblong-lanceolate, pointed, serrate, and turned obliquely, depending on the variety. In all cases, the leaves are evergreen, firm, and shiny. There's a cultivated variety that has entire leaves. The flowers are small, either greenish or pink, and gathered in small clusters in the axils of the leaves. The calyx has four teeth. The corolla is monopetalous, short, with four lobes. There are two stamens. The ovary is free and turns into a berry with a single compartment and one seed.

FLOWERS: in April and May.

RANGE: the southern provinces of France and the vicinity of Nantes.

NOMENCLATURE. German, *die steinlinde*. English, *mock-privet.* Spanish, *filirea.* The name *phillyrea* comes from the Greek word for leaf.

USES. The phillyrea is planted in winter groves. It's used for making palisades along walls. The wood is extremely hard and is suitable for lathe work. It's also very good for heating. The leaves are astringent and are a cleansing agent.

CULTIVATION. It's propagated by rooted suckers and by layering. According to M. Dumont-Courset, this has to be done in good quality pure soil during February or March. It also can be grown from seeds. In general the tree likes warm ground, a southern exposure, and shelter on its north side; otherwise there's a risk of losing it in a very harsh winter. Those grown in loose, sandy soil are hardier

and more resistant to cold than those planted in fertile soil. This species, like other phillyreas, grows naturally in Spain, Portugal, the Orient, and on the Barbary coast. It thrives in uncultivated areas, on hillsides, and at the foot of mountains. There are many varieties.

KEY TO PLATE.

618. Broad-leaved phillyrea. 1.Calyx and pistil. 2. Complete flower, enlarged.

FONTANESIA.

Family: JASMINES [*Translator's note*: now classified in the family Oleaceae].. Reproductive system: DIANDRY, MONOGYNY.

The phillyrea-leaved Fontanesia, *Fontanesia phillyreoïdes*, Billard., is a charming tree recently acclimatized in our gardens. It grows ten or twelve feet high; the numerous branches are slender and straight. The leaves are opposite, sessile, oval-lanceolate, pointed, quite entire, and resemble those of the phillyrea. The flowers are small, numerous, white, and form small axillary clusters. The calyx is persistent and has four sections. The corolla has two bifurcate petals. The two stamens, inserted on the unguis of the petals, terminate in large anthers. The ovary is free and surmounted by a style and two stigmas. The fruit is a membranous capsule without valves. It consists of two monospermous compartments.

FLOWERS: in May.

RANGE: Syria. M. de la Billardière brought it from there in 1788. In the last twenty years or so this tree has become very common in gardens.

NOMENCLATURE. The genus *Fontanesia* is named after M. René des Fontaines, an authority on Atlantic flora, the author of several other very highly regarded works, and professor of botany at the King's Garden [*Translator's note*: now the Jardin des Plantes in Paris].

USES. It's said that the leaves are used for dyeing in the Orient. The tree is used as an ornamental in gardens and in groves. They can be made into small palisades either against walls that need to be concealed or to enclose particular sections of a garden.

CULTIVATION. The Fontanesia is easily propagated from suckers, cuttings, and seeds. It doesn't suffer from the cold around Paris, and it thrives well in almost all kinds of soil as long as

it's loose and not moist. It's claimed that the somewhat harsh winters in the north of France may harm it, especially when it's placed in good quality compact soil. M. Dumont-Courset advises growing it in soil that's naturally stony, chalky, and dry.

KEY TO PLATE.

758. Phillyrea-leaved Fontanesia. 1. Complete flower. 2. Calyx and pistil. 3. Petal and stamen.

FOTHERGILLA.

Family: AMENTACEAE [*Translator's note*: the tree is now classified in the family Hamamelidaceae].

Reproductive system: POLYANDRY, DIGYNY.

The fothergilla with elm-like leaves, *Fothergilla ulmifolia*, *Linn.supp.,* is a bushy, branchy shrub about a meter high. The leaves are alternate, large, entire at their base, dentate at their tips, almost oval, quite similar to those of the alder. The small, white flowers form oval spikes; they appear before the leaves have completely developed. The calyx has five or six small uneven teeth; there is no corolla. The stamens are very numerous and have long filaments. The ovary is free and surmounted by two long club-shaped styles. It turns into a bilobed capsule with two compartments, two valves, and terminates in two points. It contains four osseous seeds.

FLOWERS: in April and May.

RANGE: North America; it's been acclimatized in France and England for about fifty years.

NOMENCLATURE. Linnaeus Jr. named this tree after Fothergill, a renowned English physician who died in 1780. He was a true philanthropist, judging from the epitaph on his tombstone:

Here lies Doctor Fothergill who spent two hundred thousand guineas to comfort the needy.

USES. Its clusters of early white flowers make an attractive sight in groves in springtime.

CULTIVATION. This is a hardy tree. In the north of France it gets through the winter in open ground. It can be cultivated in all kinds of soil, but it's much prettier and blooms more fully in heath compost. It's propagated from layers and from seeds.

M. Bosc [*Translator's note:* Louis Augustin Guillaume Bosc, 1759-1828, French naturalist], who observed it in damp regions of large woodlands in Carolina, reported that the flowers emit a strong but not unpleasant aroma, and that its capsules

are remarkably elastic; they noisily propel their seeds over a distance of more than a toise [*Translator's note*: a toise is an old French measure of length, about equal to one fathom (approximately 6 ft.)]

KEY TO PLATE.

552. Fothergilla with elm-like leaves 1. Complete flower. 2. Calyx and pistil. 3. Complete capsule. 4. Same, transverse section.

ALEXANDRIAN LAUREL.

Family: SMILACACEAE [*Translator's note*: now included in the Liliaceae family].
Reproductive system: DIOECY, SYNGENESIOUS.

The Alexandrian laurel, *Ruscus racemosus*, LINN., [*Translator's note*: named *Danaë racemosa* by the German botanist Medicus, 1736-1808] retains its foliage all winter. It's worthwhile planting it in groves at this season, because it will create a very fine impression with its clusters of handsome red fruit. It grows about three feet tall, but it's liable to grow slowly when it's beneath larger trees. The stems are straight, flexible, and branchy. The leaves are very numerous, alternate, entire, green, shiny, and pointed aslant at their tip. The flowers are hermaphroditic and are clustered at the ends of the branches. Each one is associated with small bracts. The calyx is globular, yellowish in color, and has six sections. The stamens are joined by their broad filaments into a tube and terminate in anthers. They surround the ovary, which is free, rounded, and crowned by a style and a bifid stigma. The fruit is a globular berry with a beautiful red color and with two seeds in each compartment.

FLOWERS: in June and July.

RANGE: southern Europe. It has been grown in parterres and in groves in France for many years.

NOMENCLATURE. German, *der traubenartige ruscus, oder alexandrinische lorbeer.* Dutch, *getroste muisdoorn.* English, *the alexandrian laurel.* Commonly, *the large alexandrian laurel.*

USES. It's used to decorate large parterres and groves in winter. Its shiny evergreen leaves and clusters of fruit add variety to landscapes and trees around it.

CULTIVATION. It prefers loose soil and a warm, sheltered, lightly shaded exposure. In the north of France it's best to cover the base with a bit of straw litter during severe frosts to prevent damage to the stem. It's propagated from seeds but more usually by dividing the plants in February or in March. According to M. Dumont-Courset the divided plants must not be too weak, and each one should have at least two or three stems.

KEY TO PLATE.

1. Alexandrian laurel. 2. Cluster of flowers. 3. Complete flower, enlarged. 4. Stamens, enlarged. 5. Pistil, enlarged.

EUONYMUS.

Family: BUCKTHORN FAMILY.[*Translator's note*: now classified in the family Celastraceae].

Reproductive system: PENTANDRY, MONOGYNY.

The European euonymus, *Evonymus Europeus,* Linn., [*Translator's note:* now designated *Euonymus europaeus,* (the spindle tree)] is a large shrub with a stem that grows three or four meters high. The bark on its branches is smooth and greenish. The wood is pale yellow and fragile. The leaves are oval-lanceolate, pointed, with dentate margins and are on short petioles. The flowers are whitish and small. Three or four of them are held on quite a long common peduncle. The calyx has four or five divisions with a fleshy disk inside it. The corolla has five, but more often four petals, four or five stamens, and a thread-like style. The fruit is a capsule with four or five compartments, each one containing one or two seeds covered with a pulpy red-colored aril. In one variety it's white.

FLOWERS: in May.

RANGE: France and Europe, in woodlands.

NOMENCLATURE. The common names are *priest's cap, wood for larding pins;* in the south, *beggarly priest's cap.* German, *der spindelbaum, spulbaum.* Dutch, *paapenhout, luizenboom.* English, *the spindle tree, prickle-wood.* Danish, *beenved.* Italian, *fusagine.* Spanish, *bonetero.* Russian, *mereskletiana, kislianka.* Bohemian, *bieslen*. Tartar, *ukurgol.* Kalmuk, *emegoldan.*

USES. This shrub is suitable for decorating autumn groves. Its abundant and beautiful red-orange colored fruit makes an outstanding impression. The wood is hard; it's used for making pegs, larding-pins for butchers, vessels, distaffs, and spindles. Euonymus sticks burned in an iron tube form charcoal pencils that draftsmen use to sketch initial outlines

for their drawings. The leaves have a nauseating smell; livestock never touch them. The fruit is a powerful purgative. It can kill vermin. A yellow dye extracted from it is fixed with alum.

The warty-barked euonymus, *Evonimus verrucosus,* Linn., is a shrub quite full of limbs and branches that make it very dense. The limbs and branches are covered with raised, brown, wartlike spots. The leaves are opposite, oval, acuminate, and finely dentate. The flowers, three or four together on a common peduncle, are purplish brown. The stamens are sessile and are positioned on the disk that surrounds the ovary.

FLOWERS: in May.

RANGE: northern Europe.

USES. This shrub adds variety to parks and large gardens. The color of its flowers and the warts covering its branches give it a unique appearance.

CULTIVATION. These two species of euonymus thrive in all kinds of soil. They're propagated by sowing the seeds in loose soil and in a shaded area as soon as they're ripe. Locations that are too exposed aren't good for them.

KEY TO PLATES.

661. European euonymus. 1. Complete flower, enlarged. 2. Complete capsule. 3. Same, transverse section.

662. Warty-barked euonymus. 1. Flower viewed from below. 2. Same, view from above.

CHASTE TREE.

Family: VERBÉNACEAE.
Reproductive system: DIDYNAMY, ANGIOSPERMY.

In the southern provinces, the common chaste tree, *Vitex agnus castus,* LINN., grows in open ground to a height of ten or twelve feet. But in the north it will perish if care isn't taken to place it in a suitable location. The stem is straight, bare, and has limp, supple whitish branches at the top. The leaves are petiolate and consist of five or six digitate leaflets that are narrow, pointed, entire, green above and whitish and downy underneath. The flowers, violet, purplish, or white, form spikes at the ends of the branches. The calyx is short, consisting of a single unit with five teeth at the top. The corolla is monopetalous, sort of labiate, tubular at the base and terminates in five lobes, one of which is larger and more rounded. The four didynamous stamens are longer than the corolla and insert at the top of its tube. The ovary is free; it's topped by a style and a bifid stigma. The fruit is a soft drupe containing a pit with four compartments and four seeds.

FLOWERS: in July and August.

RANGE: the south of France, in moist environments.

NOMENCLATURE. German, *der keuschbaum, keuschlamm.* Dutch, *kuischboom.* English, *the chastetree*. Spanish, *sauzgatillo.* Russian, *dikoi perez.* Commonly, *chaste lamb, pepper tree.*

USES. Athenian women dedicated to the worship of Ceres [*Translator's note*: the goddess of agriculture and fertility] put branches of this shrub next to themselves during the night, believing that this would help preserve their chastity.

For this reason the Greeks called the shrub *the chaste lamb.* Nowadays this feature of the plant is in dispute. However, the seeds have been used successfully with the water lily to control attacks of hysteria. The leaves act as a decongestant and can be applied as a compress to relieve firmness in the spleen.

CULTIVATION. It's readily propagated by seed planting and layering. According to Duhamel, it thrives quite well around Paris in all kinds of soil.

KEY TO PLATE.

1. Common chaste tree. 2. Calyx and pistil. 3. Open corolla and stamens. 4. Fruit, natural size. 5. Same, enlarged. 6. Same, transverse section. 7. Seeds.

BROOM.

Family: LEGUMINOSAE.
Reproductive system: DIADELPHY, DECANDRY.

The stem of the common broom, *Genista scoparia*, LAM., is about three feet high and has small, slightly hairy, ternate leaves. The large yellow flowers form a kind of spike. The calyx, almost entire, is divided at the top into two parts, one with two teeth and the other with three. The corolla is papilionaceous. The ten stamens unite in a tube forming a sheath around the pistil that terminates in a long, recurved style. The fruit is an oblong, flat pod with long hairs on its edges.

FLOWERS: in April, May, and June.

RANGE: France and Europe.

The Spanish broom, *Genista juncea*, LAM. [*Translator's note*: now named *Spartium junceum*], forms a bush five or six feet tall. Its many branches, quite similar to bulrushes, bear a few sparse, lanceolate leaves. The yellow flowers appear in erect clusters at the ends of the branches. The calyx is small and is cleaved only on one side. The corolla consists of a reflexed standard, two wings spaced apart, and a carina of two petals. The ten stamens are not covered by the carina. The fruit is a flat oblong pod with several seeds.

FLOWERS: from July until September.

RANGE: southern France and part of Europe.

The dyer's greenweed, *Genista tinctoria*, LINN., grows about two feet high. The leaves are lanceolate, entire, small, and sparse. The flowers, a beautiful yellow, are small,

numerous, and terminal. The calyx is bilabiate; the upper lip is divided into two lobes and the lower one into three. The corolla is papilionaceous and completely covers the reproductive organs. The ten stamens form a sheath that covers the pistil. The fruit is a smooth, oblong capsule.

FLOWERS: in June, July, and August.

RANGE: France, on hillsides and at the edges of woodlands.

NOMENCLATURE. German, *farbeginster, gilbkraut.* English, *common dyers genista.* Spanish, *retama de tinte*. Russian, *drock.* Bohemian, *ganowec.*

USES. These shrubs add ornamentation to parks and gardens. The common broom is used medicinally. The leaves and seeds serve as laxatives, diuretics, and purgatives. Soaking the branches yields a sort of fiber. Cows and sheep like to eat the new stems. The seeds of the dyer's greenweed are emetic at doses of from one eighth to half an ounce.

CULTIVATION. The shrubs are propagated by planting the seeds in flowerbeds or in plots especially prepared for them. They like a warm location and loose soil.

KEY TO PLATES.

1. Common broom. 2. Calyx, stamens, and pistil. 3. Fruit. 4. Seed.

1. Spanish broom. 2. Calyx and stamens. 3. Corolla. 4. Pistil. 5.Fruit.

1. Dyer's greenweed. 2. Calyx. 3.[*number corrected by translator*] Complete flower. 4. Stamens and pistil. 5. Complete fruit.

POMEGRANATE.

Family: MYRTACEAE [*Translator's note*: now classified in family Punicaceae.]
Reproductive system: ICOSANDRY, MONOGYNY.

According to Linnaeus, the common pomegranate tree, *Punica granatum*, LINN., originated in the vicinity of Carthage. [*Translator's note*: the genus name *Punica* is a Latin name that refers to Carthage.] Some other botanists claim that it's from the kingdom of Granada in Spain, where it grows abundantly. For several centuries it's been acclimatized just as well in Provence as the apple tree has been in Normandy. It grows twelve or fifteen feet tall; its very numerous branches are mostly near the top. The leaves are small, smooth, opposite, lanceolate, entire, and reddish when new. The flowers, situated at the ends of the branches, are a beautiful red but sometimes white. There's a variety that has thorns at the ends of the branches and sour fruit. The calyx is fleshy, leathery, red, funnel-shaped, and terminates in five or six divisions. The five or six petals of the corolla are inserted in the calyx as well as a very large number of stamens. The ovary is adherent and is crowned by a stigma at the top. The fruit is spherical with a leathery skin, crowned by the divisions of the calyx and divided on the inside by a transverse diaphragm into two unequal chambers; each one has compartments and a very large number of seeds.

FLOWERS: in July and in September.

RANGE: the southern provinces of France, Italy, and Spain.

NOMENCLATURE. German, *der granatbaum, granatapfel*. Dutch, *granaatboom*. English, *the pome-granate tree*. Italian, *melagrano*. Spanish, *granado*. Russian, *granatnik, gratoschnoe derewo*. Hungarian, *poma granat*. Arabic, *rumman*. Hebrew, *rimmon*.

USES. According to Mathiole and earlier physicians, the fruit, flowers, roots, etc., are a wonderful remedy for earaches, elevated temperature in the mouth, urinary retention, and blood loss. Sour pomegranates are more regularly used; they're made into a highly rated syrup to relieve the intense thirst of persistent fever. The skin of the fruit is used as an astringent; it's prescribed as a powder and as a decoction.

The double-flowered pomegranate tree is one of the most beautiful ornaments of our gardens. But in the north of France it has to be kept in a conservatory during the winter.

CULTIVATION. This tree puts out a lot of shoots at its base that facilitate its propagation. It's also reproduced by layering which must be done as follows: the base of a branch is tied with a small iron wire. This section is inserted into a pot filled with good quality loose soil and is supported by any means available. As a result of the ligature, a swelling forms from which roots emerge. At the end of the summer, the branch is ready to be severed, provided that the soil has been kept extremely moist.

There are two known varieties with white flowers; one of them has single flowers, the other is double-flowered.

KEY TO PLATE.

1. Common pomegranate tree. 2. Calyx, pistil, and stamens. 3. Fruit reduced to about half-size.

CURRANT BUSH.

Family: NOPALEÉS. [*Translator's note*: now in family Saxifragaceae].
Reproductive system: PENTANDRY, MONOGYNY.

The Alpine currant bush, *Ribes alpinum*, LINN., exhibits a peculiarity that has deceived several botanists. Its flowers sometimes are entirely male or female. In other individuals, like the one that I used for the attached figure, they're entirely hermaphroditic. This variation in sexual organs led shortsighted observers to invent different species for the same plant.

The Alpine currant bush grows four or five feet high. Its stems are covered with a whitish bark. The leaves are small, smooth, petiolate, with three lobes, dentate margins, bright green above, and pale green underneath. The flowers form upright clusters and have long, pointed bracts. The calyx has five colored sections. The corolla is made up of five petals that alternate with the sections of the calyx. The five stamens are opposite the petals. The ovary is adherent and is crowned by a bifurcate style. The fruit is a berry with one compartment and several seeds.

FLOWERS: in April and May.

RANGE: in hedgerows in mountainous country at the foot of the Alps, the Jura, and the Vosges, in the Cévennes, and in the vicinity of Barèges [*Translator's note*: Cévennes: a mountainous region in south central France. Barèges is a village in the Pyrenees near Lourdes].

NOMENCLATURE. German, *die wilde johannisbeere, alpen johannisbeere, folkbeere*. Dutch, *bergbessen*. Danish, *fieldribs*. English, *tasteless mountain currants*. Russian, *gluchaja smorodina*.

USES. The fruit is as sweet and refreshing as that of

other currant bushes. It can be used for the same purposes.

CULTIVATION. This currant bush adapts to all kinds of soil and to all exposures. However, it does prefer shaded and untilled locations. It's readily propagated from cuttings that will bear fruit after three or four years.

KEY TO PLATE.

1. Alpine currant bush. 2. Complete flower, enlarged. 3. Cluster of fruit.

CURRANT BUSH.

Family: GROSSULARIACEAE [*Translator's note*: now in Saxifragaceae].
Reproductive system: PENTANDRY, MONOGYNY.

The black currant bush, *Ribes nigrum*, Linn., known to gardeners as *cassis* or *cassier,* is a shrub that grows five or six feet tall on an erect, branchy trunk. The leaves are large, petiolate, smooth, irregular, and dentate. Their undersurfaces often are covered with yellow, glandular spots. The flowers are bell-shaped, whitish green or reddish. They're in loose, pendent clusters of about five or six. They're replaced with quite big globular black fruit that has a slightly aromatic flavor.

RANGE: mountains of the Auvergne and Dauphiné.

NOMENCLATURE. German, *bocksbeere, braunebeere*. Danish, *solbar*. English, *black currants*. Russian, *smorodina tschernaja*.

The gooseberry bush, *Ribes grossularia,* Linn., [*Translator's note*: also designated *Ribes uva-crispa*], commonly called *groseiller à maquereaux,* is a bush about three or four feet high. The stems are supplied with thorns, two or three together, at the base of the leaves. The leaves are petiolate, rounded, crenate, incised, and slightly hairy underneath. The reddish flowers, normally in pairs, are attached to short, pendent peduncles. The ovary, adherent to the calyx, becomes a round berry varying in color and covered with hair.

There are several varieties; the most notable ones are those with: 1° green fruit, 2° yellow fruit, 3° red fruit.

FLOWERS: in March and April, like the preceding species.

RANGE: hedgerows and woodlands of France.

NOMENCLATURE. German, *stachelbeere, klosterbeere*, *lausbeere.* Danish, *krusbœr*. English, *gooseberry*. Italian, *grispignolo.* Russian, *krischownik*. Polish, *agrest.* Bohemian, *polka.*

The Pennsylvania currant bush, *Ribes pensylvanicum, Lam.,* is a shrub about three feet high, with whitish bark and numerous loose branches. The leaves are quite large, alternate, petiolate, and smooth. They're divided into three lobes that are smooth with serrate margins.

The pale yellow flowers are in single pendent clusters and are accompanied by bracts that are longer than the pedicels. The fruit is a sour black berry.

FLOWERS: in April.

RANGE: North America; acclimatized in our gardens.

The *Cynobasti* gooseberry, *Ribes cynosbati,* Linn., is a bush four or five feet high with a straight stem. The branches, rather loose and spread out, have a small, straight thorn at their base. The leaves are green, petiolate, with three or five lobes and crenate margins. The flowers, two or three together in pendent clusters, are whitish green. The calyx is covered with stiff bristles that remain on the fruit.

FLOWERS: in April.

RANGE: North America; acclimatized in our gardens.

USES. A ratafia prepared with black currants acts as a tonic and a stomachic. In former times the leaves and new shoots, taken as an infusion, were promoted as stomachics, diuretics and aperients, but they're no longer used medicinally. Gooseberries are used in sauces, as a substitute for verjuice grapes, and in seasoning for mackerel, but in general they're not much valued in France. In England gooseberries are consumed in all sorts of ways: in pastries, in plum pudding, and even to make a kind of wine that isn't too bad.

CULTIVATION. The bushes are easily propagated from cuttings and are suited to almost all kinds of soil. They're never harmed by the cold, and they don't need to be protected from it.

KEY TO PLATES.

572. Black currant bush. 1. Flowering branch. 2. Complete flower, longitudinal section. 3. Fruit, transverse section.

573. Gooseberry bush. 1. Complete flower, opened. 2. Red fruit. 3. Yellow fruit. 4. Fruit, transverse section.

574. Pennsylvania currant bush. 1. Complete flower. 2. Same, opened.

575. *Cynosbati* gooseberry bush. 1. Complete flower, opened.

SNOWDROP TREE.

Family: PERSIMMON FAMILY [*Translator's note:* now in family Styracaceae].

Reproductive system: DODECANDRY, MONOGYNY.

The four-winged snowdrop tree, *Halesia tetraptera*, LINN., [*Translator's note:* now designated *Halesia carolina*] is a tree that arrived from America to populate our groves and to take its place among the brooms, lilacs, and Judas trees. The trunk rises twenty or thirty feet. The limbs are extremely rigid and brittle. The leaves on the branches are alternate, oval-lanceolate, pointed, with dentate margins, short petioles, green above and somewhat pale underneath. The flowers are white, pendent on long peduncles and grouped four or five together on older branches. They appear before the leaves develop. The calyx is very small, with four not very deep indentations. The corolla is large, bell-shaped, bulged out, and has four lobes. There are twelve to sixteen stamens; the filaments join in a tube at their base, are adnate to the corolla, and terminate in erect oblong anthers. The ovary is adherent and crowned by a style and a stigma. The fruit is an oblong nut with four winged corners. It's pointed at the style, which remains attached. It has four compartments and contains four seeds.

FLOWERS: in May.

RANGE: Carolina. It's naturalized in our gardens where the fruit ripens.

NOMENCLATURE. *Halésia*, from Stephen Hales, the English naturalist born in 1677 and died in 1761. A member of the Royal Society of London, he is the author of *Vegetable Staticks*, translated by Buffon [*Translator's note:* the work was published in 1727, the French translation in 1735]. In English, *the snow-drop-tree*.

USES. This tree is suitable only as an ornamental for groves in springtime. It accomplishes this objective well.

CULTIVATION. It likes good quality soil. The fruit ripens in France where the tree is propagated by planting its seeds. They often come up only in the second year. It also can be propagated by layers, which become well rooted only after three years. It's not afraid of the harshest winters.

KEY TO PLATE.

The four-winged snowdrop tree. 2. Calyx and pistil. 3. Open corolla and stamens.

0325

TREATISE

ON TREES

AND

SHRUBS

GROWN IN FRANCE BY CULTIVATION AND IN OPEN GROUND

BY M. JAUME SAINT-HILAIRE;

PREFACED WITH A GUIDE TO GROWING TREES AND SHRUBS, BY M. THOUIN, PROFESSOR AT THE KING'S GARDEN

ILLUSTRATED WITH FIGURES PRINTED IN COLOR AND RETOUCHED WITH BRUSHWORK

VOLUME II

****

PARIS

THE AUTHOR'S HOME, 3 RUE FURSTEMBERG

ABBAYE SAINT-GERMAIN

****

FIRMIN DIDOT PRESS, 24 RUE JACOB

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1825

JASMINE.

Family: JASMINE family [*Translator's note*: now Oleaceae].
Reproductive system: DIANDRY, MONOGYNY.

The common jasmine, *Jasminum officinale,* LINN., has a climbing stem that reaches ten or twelve feet in height. The branches are slender and flexible. Their compound leaves are imparipinnate; the terminal leaflet is much larger than the others. The flowers are white and are situated at the ends of the stems and branches. The calyx is small, short, and has five long hair-like lobes. The monopetalous corolla terminates in five flat, pointed divisions. Two stamens are inserted in the tube of the corolla. The ovary is free; it becomes a berry with two monospermous compartments.

FLOWERS: from July into October.

RANGE: the Malabar coast. Naturalized in Europe for several centuries.

NOMENCLATURE. *Jasminum,* from *ysmym,* the Arabic name for this bush. German, *gemeine weine* [*Translator's note:* probably *weisse*] *jasmin*. English, *common white jasmin*. Portuguese, *gelsemino bianco*.

The Italian jasmine, *Jasminum humile,* LINN., grows to a height of four or five feet. The stem is crooked. It has flexible branches bearing leaves with three, four, or five oval leaflets that are green, smooth, and entire. The terminal one usually is larger than the others. The flowers are yellow and odorless. Their calyx is tubular with five small denticulations. The corolla is monopetalous, tubular, and has five lobes. The two stamens are sessile at the top of the tube of the corolla. The fruit is a berry with two compartments, each containing an arillate seed.

FLOWERS: from July into September.

RANGE: southern France and Italy.

NOMENCLATURE. German, *gelbe zwergjasmin.* English, *italian yellow jasmin*.

USES. The flowers of the common jasmine are thought to be emollients and resolutives, but they're not used medicinally.

At Grasse in Provence this bush is carefully cultivated in gardens and in areas along riverbanks. Every morning the flowers are gathered for transport to perfume factories. There they're put into glazed earthenware vessels or in glass drawers coated with a layer of unscented ointment that absorbs and retains their fragrance. This procedure has to be repeated for several days if one wants to give the ointment a strong scent of jasmine. An oil of jasmine also is prepared by placing layers of the flowers over cotton soaked in ben oil, but none of the fragrance can be extracted by distillation.

Both of these bushes add ornamentation to any garden.

CULTIVATION. They're easily propagated, by laying down their branches or from shoots. They grow in all areas, but loose, warm soil suits them the best. Sometimes they lose some of their stems in severe cold, but the base of the plant doesn't die.

KEY TO PLATES.

1. Common jasmine. 2. Calyx. 3. Pistil. 4. Open corolla and stamens.
1. Italian jasmine. 2. Calyx and pistil, enlarged. 3. Open corolla and stamens.

JUJUBE TREE.

Family: RHAMNACEAE.
Reproductive system: PENTANDRY, DIGYNY.

The cultivated jujube tree, *Rhamnus ziziphus*, Linn., [*Translator's note:* now *Ziziphus jujuba*] is a beautiful tree that rises thirty or forty feet high. The trunk is twisted and covered with slightly cracked brown bark. The large number of branches have a pair of thorns of unequal length at their base. They're full of smooth, oval-oblong leaves that have three distinct veins and dentate margins. The flowers are small, yellowish, axillary, and are held on short peduncles. The calyx has five divisions; the corolla has five petals that alternate with the divisions of the calyx. The five stamens, opposite the petals, are inserted on a disk that surrounds an ovary crowned with two styles. The fruit is an ovoid drupe that's red when it's ripe. Its flesh covers a pointed pit with two compartments and two seeds.

FLOWERS: July and August.

RANGE: Syria. It was brought from there to Rome by Sextus Pomponius in the time of Augustus. Later it spread over all of Italy and from there to Provence, where it is now naturalized.

NOMENCLATURE. German, *die brustbeere.* English, *the jujube tree*. Spanish, *azufayfo*. Portuguese, *anafegfa*. Turkish, *unap*. Dialect of the south of France, *chichourlier, guindoulier*. Arabic, *zizouf.*

USES. The wood of the jujube tree is hard, heavy, and reddish in color. It polishes up beautifully, and it's used in lathe work. The fruit has quite a pleasant flavor. It's consumed in the south of France, but only the dried fruit is used medicinally. The jujube fruit is good for respiratory diseases and is a soothing agent. It's prescribed for coughing up blood and for pain in the urinary tract. As a decoction it's given

at doses from two eighths of an ounce to one ounce per pint of water. It's often mixed with other fruits that are good for respiratory diseases, such as raisins, dates, and figs. Syrup and lozenges prepared from it can relieve coughs and soreness in the chest.

CULTIVATION. The jujube tree is easily propagated from seeds and by suckers. It likes sandy, dry, loose soil. In the south it's planted out in the open, but in the north of France it has to be placed against a south-facing wall and covered with straw mats during the winter. In spite of these precautions, it's often damaged by the cold, and the fruit is never as good as it is in the south.

KEY TO PLATE.

625. Cultivated jujube tree. 1. Complete flower. 2. Fruit stripped of part of the flesh that covers the pit. 3. Transverse section of the pit showing the seeds.

HIBISCUS.

Family: MALVACEAE.
Reproductive system: MONADELPHY, POLYANDRY.

The garden hibiscus [*Translator's note*: rose of Sharon, shrub althea], *Hibiscus syriacus,* LINN, is a small tree that grows six, eight, or ten feet tall. The leaves, alternate on young branches, are oval, cuneate at the base, and divided into three lobes with crenate margins. The flowers, usually red, are solitary. The outer calyx consists of seven or eight linear leaflets; the inner calyx has five sharply pointed divisions. The corolla is formed of five petals, joined at their base and attached to a tube formed by a large number of stamens. The ovary is free and is surrounded by the tube of stamens. The flower is replaced with a capsule of five compartments containing several kidney-shaped seeds.

VARIETIES: 1. Red flowers. 2. Violet-purple flowers. 3. White flowers with bright red ungues. 4. Diversified flowers. 5. Double flowered. 6. Variegated leaves.

FLOWERS: from the beginning of August until about October 15th.

RANGE: Syria and the Levant.

NOMENCLATURE. English, *althea frutex*; German, *syrische hibiscus*; common name, *tree mallow*.

HISTORY: This tree, naturalized now in France and in a large part of Europe, appears to have been known only since the sixteenth century. Jean Bauhin, who wrote his *General Natural History of Plants* about the same time, claims to have seen this tree for the first time in the garden of Jean Robin, the botanist for Henri IV and later for Louis XIII. Embroidery work was very much in demand at the time.

The king appointed Jean Robin, who owned a botanical garden in the Faubourg Saint-Denis [*Translator's note:* a suburb of Paris], to cultivate the rarest and most beautiful plants as subjects for designers and embroiderers. In 1608 this botanist published a catalog of 1300 plants that he grew in his garden, many of which he had collected on his journeys.

USES. The flowering shrubs of this plant display their greatest variety when the sun

> Has passed the shining sign of Gemini
> And in triumph pursues his course atop the sky;
>
> CASTEL.

[*Translator's note:* the sun is in Gemini close to the summer solstice in June] and when the vivid violets, whites, purples or reds of their wide corollas are elegantly arranged in groves or in ornamental gardens.

CULTIVATION. This hibiscus is propagated from seeds planted in April in trays filled with good quality, slightly loose soil. These are then set in a hotbed. The plants can stay in the tray for the first year; they're sheltered from frost in winter. The seedlings are removed the following spring and put in pots or transplanted to a nursery, taking care to cover them well when it starts to get cold. The soil where they'll be planted should be gentle, substantial, but always somewhat compact.

KEY TO PLATE.

1. Garden hibiscus. 2. Open calices showing the location of the pistil. 3. Capsule, transverse section. 4. Seeds.

GOLDEN RAIN TREE.

Family: SAPINDACEAE.
Reproductive system: OCTANDRY, TRIGYNY.

The golden rain tree, *Koelreuteria paniculata,* Lam., *Supindus chinensis*, Linn., is a large tree with a straight, branchy trunk and numerous branches. The leaves are large, alternate, imparipinnate, with five or six pairs of dentate leaflets that are pointed, smooth, and are frequently even incised or lobed. The flowers form large panicles. They're spread out and are an attractive yellow color. The calyx has five small divisions. The corolla has four petals, glandular at the base and much longer than the calyx. The eight stamens are crowned with upright, oblong anthers. The ovary is free and pedicellate. The style has three edges and terminates in a stigma in three sections. The fruit is a membranous, vesiculate ovoid capsule. It has three compartments containing three seeds. One of them is likely to abort.

FLOWERS: in August.

RANGE: China. Acclimatized for about fifty years in parks and large gardens in the vicinity of Paris.

NOMENCLATURE. *Koelreuteria,* after Joseph Kœlreuter [*Translator's note*: 1733-1806], a German botanist and member of the Academy of St. Petersburg.

USES. This is one of the prettiest trees naturalized in France during the last century. The new leaves are pink when they unfold and retain the color for about two months afterwards. They make a lovely sight among groves in large parterres. Its many brilliant yellow flowers at the end of the summer make this an exquisite tree for a garden. It's said to contain lots of honey and that it's a great advantage to place it where bees are raised.

CULTIVATION. This tree, grown from seeds, needs to be treated with some care during its first two or three years,

especially in the north of France. It's also propagated in February from cuttings that are put in pots filled with substantial soil, taking care to place them in a moderately warm manure bed. The cuttings take root a month later; they're removed in the autumn.

KEY TO PLATE.

684. Golden rain tree. 1. Stamens and pistil. 2. Corolla and stamens, enlarged. 3. Detached petal, enlarged. 4. Capsule.

LAUREL.

Family: LAURACEAE.
Reproductive system: ENNEANDRY, MONOGYNY.

The common laurel tree, *Laurus nobilis,* Linn., is a beautiful tree in southern Provence. It grows twelve or fifteen meters tall. The leaves are alternate, lanceolate with undulate margins, firm, leathery, and persistent. They crackle when burned and emit a pleasant aroma. The flowers are small, yellowish, set in the axils of the leaves, and are dioecious. The calyx has four divisions. The stamens, six to eight of them, are arranged in two rows. They have two appendages at the base. The anthers open from bottom to top. The ovary is free; it converts to a fleshy drupe.

FLOWERS: in May.

RANGE: Italy and southern Provence.

NOMENCLATURE. *Daphne* in Greek. German, *der lorbeerbaum*. English, *common sweet bay*. Italian, *alloro*. Russian, *lawr*. Bohemian, *bobkowy strom*. Colloquial French, *sauce laurel tree, ham laurel tree*.

The sassafras tree, *Laurus sassafras*, Linn., is a ten- or twelve-meter high tree in North America. It doesn't get that tall in Kew or around Paris, where it's grown in open ground. The leaves are alternate and petiolate. Some are oval and entire; others have two or three lobes and are deciduous. The flowers are small, herbaceous, dioecious, and form loose terminal clusters. The calyx has six divisions; there are seven or eight stamens. The fruit is a fleshy drupe.

FLOWERS: in May and June.

RANGE: Carolina.

USES. The ancients believed that the common, or Apollo's, laurel tree is never struck by lightning. The emperor Tiberius put on a crown of laurel during storms

to protect himself from thunderbolts. The tree was consecrated to Apollo, undoubtedly because of its enduring greenery. It was planted at the palace gates of Caesars and pontiffs. It was believed to guard against all sorts of poisons and plagues.

The fruit of the common laurel tree yields two kinds of oil: one is volatile and is obtained by distillation; the other is stable and is extracted by pressing. In the latter case the fruit is picked when fully ripe; it's crushed and put in a large boiler full of water. It should be slowly boiled for several hours. The boiling liquid together with the residue is poured into a rather thin cloth bag and passed through it. The residue is then pressed to get the rest of the oil out of it. When cooled it congeals on the surface of the water. It's collected and stored in jars. The oil is used both in human and in veterinary medicine. An aqueous infusion of the leaves can successfully stimulate and strengthen the stomach, activate blood circulation, and promote menstrual flow.

The sassafras tree is used as a sudorific and as an antipyretic. In America an infusion similar to tea is made from the flowers. The bark is highly aromatic; a fragrant oil can be extracted from the roots.

CULTIVATION. The common laurel tree is propagated from cuttings and from seeds. In the north of France it should be placed against a wall with a good exposure. The sassafras prefers dark, loose, and slightly damp soil. In the north it should not be put in open ground until it's two or three feet high.

KEY TO PLATE.

619. Common laurel tree. 1. Flower prior to opening. 2. Stamen, enlarged. 3. Pit of the fruit, transverse section.

620. Sassafras tree. 1. 2. Flowers. 3. Fruit.

OLEANDER.

Family: APOCYNACEAE.
Reproductive system: PENTANDRY, MONOGYNY.

The large-flowered oleander, *Nerium grandiflorum,* is a tree recently introduced into conservatories in the north of France. It appears to be a variety of the *Nerium odoratum* of Lamarck enhanced by cultivation. It's incontestably one of the most beautiful acquisitions of recent times. The first specimen, the progenitor of all those seen in our gardens today, was brought to Paris in 1809. It had been raised in the gardens of the Grand Duke of Tuscany. The leaves are quite similar to those of the common oleander. The flower is much larger and is fragrant; all of its components have been converted into petals.

FLOWERS: from June until September.

RANGE: the East Indies. Grown in open ground in the south of France.

The common oleander, *Nerium oleander,* Linn., is a large evergreen shrub that grows eight or ten feet tall. The leaves are opposite, often ternate, entire, lanceolate, stiff, and dark green. The flowers are odorless and have a fringed crown inside. The calyx is persistent, very small, with five sharp, linear sections. The corolla is monopetalous, funnel-shaped, with a wide tube and longer than the calyx. Its limb is broad and deeply indented into five blunt, oblique segments. There are five stamens inserted into the tube of the corolla. Their anthers are convergent, ciliate, and terminate in silky tufts. The fruit consists of two conical follicles that open from top to bottom and contain seeds that overlap one another like fish scales.

FLOWERS: from June until September.

RANGE: Spain, the Levant, and Provence. I've found it to be very plentiful at Dardenne, close to Toulon.

NOMENCLATURE. *Nerium* is derived from a Greek word meaning *wet*, because it grows naturally on the banks of streams [*Translator's note*: Nereus was a god of the sea]. *Oleander* comes from *olea*, *olive tree,* because its leaf is stiff like that of the olive tree and it's largely similar in shape. German, *giftrosenbaum.* English, *common rosebay.* Italian, *rosalauro, mazza di S. Giuseppe.* Arabic, *tiflae.*

USES. The common oleander has served as an ornamental in large parterres for a long time. It often shares with the orange tree the distinction of being displayed in the public gardens of Paris and its surroundings. The other, more delicate, species is beginning to be more widespread; its lovely bouquets of soft pink flowers have attracted the attention of connoisseurs. In a few years it probably will be as familiar as the first one.

CULTIVATION. These two species and their varieties need to be kept in a conservatory during the winter in the north of France. They're raised in containers in earth that's substantial and compact. In summer they're placed in the warmest possible exposure and watered frequently. In winter, dampness is the death of them; it gets the new shoots moldy and kills them. Oleanders don't need frequent changes of their boxes or containers. If they're given fresh soil or too much of it, they put out a lot of branches and fewer flowers. The first species grows few roots; it can stay in the same box for six years. Oleanders are propagated from shoots or by layers that take root easily. In the south the seeds of the common oleander ripen and they can be used for propagation.

KEY TO PLATE.

501. Large-flowered oleander.
502. Common oleander. 1. Open corolla and stamens. 2. Complete fruit.

WILD ROSEMARY.

Family: RHODORACEAE. [*Translator's note:* now in the Ericaceae family]
Reproductive system: DECANDRY, MONOGYNY.

The marsh rosemary, *Ledum palustre,* LINN., is a shrub with a penetrating and somewhat narcotic odor. It grows about a foot high. The stem is cylindrical, branching, and covered with an ash-colored bark. The lower part is bare. Its new branches are reddish yellow and covered with down. The leaves are alternate, oblong, and almost sessile. Their margins fold under like those of rosemary leaves. They're green above; the entire undersurface is covered with reddish rust-colored down. The flowers ordinarily bloom twice a year. At first they're pedunculate, arranged in sessile corymbs at the ends of the branches. Toward the end of the season they appear at the tips of the new seasonal shoots and are sort of sessile around the middle of the branches. They're white but are covered with reddish scales before they unfold. The calyx is small and has five teeth. The corolla has five very deep divisions. The ten stamens insert at the bottom of the calyx. The ovary is free, surmounted by a style and stigma. The fruit is a capsule with five compartments and five valves that open from bottom to top. The numerous seeds insert onto five thread-like placentas that are fused at the top of the central axis.

FLOWERS: Early spring and toward the end of September.

RANGE: Damp and peaty areas in France and parts of Europe.

NOMENCLATURE. The genus name *Ledum* was used by the ancients for a kind of cistus. German, *der porch, postkraut*.

English, *the marsh ledum, the wild rose-mary*. Russian, *bagulnick*. Bohemian, *royo weyk*. Mogul, *ssorkaro*. Finnish, *suckanarwa*.

USES. It's cultivated in gardens of specialists and in botanical institutes.

In northern Europe growers put the branches in their wheat granaries; the aroma keeps rats away. Swedish peasants boil it in water and use this decoction for washing their livestock to get rid of lice. In Germany they put it in beer to make it aromatic; but along with the fine aroma it also adds a narcotic quality.

CULTIVATION. This shrub likes damp, shaded locations as well as heathland. It's propagated by layering and from shoots. The latter need time to become well rooted; they should be pulled up in February rather than in the autumn.

KEY TO PLATE.

1. Marsh rosemary. 2. Stamens and pistil, enlarged. 3. Fruit. 4. Same, transverse section. 5. Seeds.

IVY.

Family: CAPRIFOLIACEAE [*Translator's note:* now Araliaceae].
Reproductive system: PENTANDRY, MONOGYNY.

The common ivy, *Hedera helix,* Linn., is a creeping shrub that climbs on trees and old walls by means of specialized tendrils. Sometimes it grows in the shape of a tree and it holds itself up without any support. The leaves are petiolate, firm, and shiny. The lower ones are lobed and angular; the upper ones that accompany the flowers are pointed ovals, almost entire, with undulate margins, green above and whitish green underneath. The flowers cluster in corymbs at the ends of the stems. The calyx has five teeth. The corolla is whitish. Its five petals are oblong and fleshy; they alternate with five stamens with versatile anthers that are bifurcate at the base. The ovary adheres to the calyx. It converts to a berry with five compartments and contains five seeds.

FLOWERS: in September and October.

RANGE: France and part of Europe.

NOMENCLATURE. There's no agreement about the origin of the word *Hedera.* Some think that it comes from the Latin *edere,* to consume, because it corrodes the walls to which it's attached. Others believe that it's derived from the Celtic *hedea,* meaning *twine.* German, *der epheu*, *eppich eiwg*. Dutch, *klimop*. Danish, *vedbende*. English, *the ivy*. Italian, *edera*. Spanish, *hiedra*. Russian, *bljustsch*. Bohemian, *brectan*. Persian, *bjcullu*.

USES. In Egypt the ivy was consecrated to Osiris and given the name *Chenosiris,* which according to Plutarch means plant of Osiris. The Greeks dedicated it to Bacchus because it resembled the grapevine in the shape of its leaves and its clusters of fruit. During Dionysian festivals to this god that fell in springtime when the foliage of the grapevine hadn't fully developed,

the Athenians made their crowns and thyrsi out of ivy.

The ivy's berries are purgative. Some country folk take up to ten or twelve of them to achieve a substantial clearing, but this treatment is no longer used medically because it's too powerful. Ivy leaves are often used to cover cauteries and vesicants to keep them fresh; they don't seem to have any other properties. As a decoction they can cleanse old ulcers, and they're used for getting rid of vermin.

In some areas of the south drops of resin called *ivy gum* are extracted from incisions made in the stems; it's used in painting to make varnish.

CULTIVATION. There's a cultivated variety with variegated leaves that can be useful for covering unsightly old walls.

KEY TO PLATE.

580. Common ivy. 1. Lower leaf. 2. Complete flower. 3. Corymb of fruit.

LILAC.

Family: JASMINE FAMILY [*Translator's note:* now in Oleaceae]
Reproductive system: DIANDRY, MONOGYNY.

Of all the shrubs naturalized in France, the lilacs are beyond doubt the most exceptional for the elegance, early blooming, and sweet fragrance of their bouquets of flowers. Moreover, they're so widely cultivated in our parks and gardens that few people suspect that they originated in the Orient, and that they came from the vicinity of ancient Babylon.

The common lilac, *Lilac vulgaris,* Lam., *Syringa vulgaris,* Linn., is a shrub about three or four meters high. The leaves are petiolate, opposite, entire, heart-shaped, pointed, and smooth. The flowers are a beautiful purple, sometimes white, and form clusters at the tips of the branches. The calyx is a single unit with four teeth. The corolla is monopetalous; it's top is indented into four slightly concave sections. The two stamens are concealed inside the tube. The ovary is free. It turns into a flattened oval capsule with two compartments, two valves, and two seeds.

FLOWERS: in May.

RANGE: the Orient. The lilac was brought from Constantinople in 1562 by Busbeck, ambassador of Ferdinand I, King of the Romans. [*Translator's note:* Augier Ghislain de Busbeck, 1522-1592, was the ambassador of the Holy Roman Empire to the court of the Sultan in Constantinople from 1554 to 1592. He introduced the lilac and the tulip into Europe from the Orient. Ferdinand I, a Habsburg Emperor of the Holy Roman Empire who ruled Austria, Bohemia, and part of Germany, held the title *King of the Romans* prior to his coronation as Emperor.]

NOMENCLATURE. According to Plukenet, [*Translator's note*: Leonard Plukenet, 1642-1706, was Royal Professor of Botany and gardener to Queen Mary II at Hampton Court] *lilac* comes from *agemlilag,* its name in Persian. German, *syrene, syringsbaum, lilak*. English, *the common lilac*. Spanish, *lila*. Russian, *serik*. Hungarian, *borostyan*.

The hybrid lilac, *Lilac chinensis,* Willd., [*Translator's note:* now designated *Syringa* x *chinensis*] is a shrub that first was cultivated in the botanical garden at Rouen. It was grown by M. Varin, the director of the garden, from the seeds of a variety of Persian lilac. Its leaves are much smaller than those of the common lilac, and the branches are slender like those of the Persian lilac. Its flower clusters are more elongated than the latter's.

This species, which can be thought of as a variety, is remarkable for the ease with which gardeners can accelerate its blooming.

The Persian lilac, *Lilac persica*, Lam., *Syringa persica,* Linn., is a shrub about three meters tall. Its leaves are lanceolate, pointed, entire, or pinnatifid. The light purple flowers form pyramidal panicles, most often at the ends of the branches.

FLOWERS: toward the end of May.

RANGE: Persia.

USES. Lilacs are used to decorate parks and gardens in France and in a large part of Europe.

CULTIVATION. These shrubs do best in gentle, loamy soil. They're very hardy and are not damaged by cold. However, the Persian one is more delicate; its flower clusters sometimes are ruined by spring frosts, especially in northern France. They're propagated from shoots that are removed in the fall and put in storage. A shoot suitable for transplanting should be four or five *lignes* in diameter [*Translator's note*: one *ligne* is about one-twelfth of an inch].

KEY TO PLATES.

613. Common lilac. 1. Calyx and pistil. 2. Complete flower. 3. Open corolla and stamens.
614. Persian lilac with laciniate leaves. 1. Calyx. 2. Corolla and stamens. 3. Complete flower.
615. Hybrid lilac. 1. Complete flower. 2. Open corolla and stamens. 3. Calyx and pistil.

BOX THORN.

Family: SOLANACEAE.
Reproductive system: PENTANDRY, MONOGYNY.

The cultivated box thorn, *Lycium barbarum,* Linn., originally from southern Europe and North Africa, has long since spread into different regions of France where it forms beautiful hedgerows during its flowering season. Its stems, about seven or eight feet high, bear lots of long, flexible branches that have a few thorns. Several leaves, oblong, pointed, and entire, are joined together at the base of the branch but they're almost solitary at the ends. The flowers are whitish below and purple-red inside. They're located at the axils of the leaves and suspended on long, usually slightly pendent peduncles. The calyx is a single unit with two lips: one entire and one bifid. The corolla is monopetalous, funnel-shaped, and its limb is divided into five lobes. The five stamens are a little longer than the lobes of the corolla. They're inserted near the middle of the tube and have a little tuft of hair at their base. The ovary is free. It's topped by a style and a stigma. The fruit is an orange-red, slightly pointed oval berry. It contains several seeds inserted into the septum.

Several authorities have confused this bush with the European box thorn. However there's a difference in the shape of its fruit, which is oval and almost pointed at the tip, whereas that of the Eurpean box thorn is round like that of the currant bush.

FLOWERS: all summer long. I've found it blooming in November

on a hedgerow in the vicinity of Laigle in Normandy [*Translator's note:* l'Aigle in Normandy is about 140 km. west of Paris].

RANGE: It's been acclimatized in several parts of France.

NOMENCLATURE. The genus was named *Lycium* because the first known species originated in Lycia [*Translator's note:* a former Roman province in a mountainous region of south west Asia Minor]. Japanese, *fekofats, koohonki*. Chinese, *kou ki*. Commonly, *the jasminoid.*

USES. This plant deserves to have a place in a landscaped garden. Its long flexible branches full of flowers make a lovely sight in less cultivated areas and on steep slopes like the hills in the Kings Garden.

CULTIVATION. This is a very hardy bush. It often proliferates abundantly wherever it's been placed. In autumn its root suckers are pulled up for planting elsewhere and to control excessive growth.

KEY TO PLATE.

1. Cultivated box thorn. 2. Calyx and pistil. 3. Open corolla and stamens. 4. Complete fruit. 5. Same, transverse section.

MOONSEED.

Family: MENISPERMACEAE.
Reproductive system: DIOECY, DODECANDRY.

The common moonseed, *Menispermum canadense,* Linn., is a climbing shrub. Its flexible stems wind from right to left around the first support that they find. The leaves are alternate, umbilicate, heart-shaped with three lobes, dark green, and are on long, reddish petioles. The flowers, small and greenish, are in pedunculate clusters. The male ones have a calyx in two sections, four or six outer petals and eight inner ones; there are sixteen stamens. The female flowers likewise have a calyx in two sections, eight sterile stamens, two or three ovaries, and the same number of styles and stigmas. The fruit is made up of two or three berries that have a single seed.

FLOWERS: in June and July.

RANGE: Canada, Virginia.

NOMENCLATURE. *Menispermum* is made up of two Greek words that mean *moon* and *seed,* because the seed is crescent-shaped. German, *der kanadische mondsame*. Dutch, *kanadasch gulpzaad*. English, *the Canadian moonseed*.

USES. This shrub has been used successfully for a long time to cover arbors and to form trellises in our gardens, where it grows profusely on its own.

CULTIVATION. It's very easily propagated from seeds and cuttings.

The Menispermum genus embraces a large number of species, but almost all of them live in warm regions of the Old and New Worlds. One of them produces the Indian berry [*Translator's note:* possibly cocculus indicus, the berry of the vine *Anamirta cocculus*] sometimes used for killing fish, despite police regulations that prohibit this kind of fishing under penalty of corporal punishment.

Calumba root [*Translator's note:* probably *Jatorrhiza palmata,* Menispermaceae family], used medicinally for colic and indigestion, also is believed to come from a species of moonseed.

KEY TO PLATE.

560. Common moonseed. 1. Complete fruit. 2. Open berry showing the seed.

SWEET GALE, BAYBERRY.

Family: AMENTACEAE [*Translator's note*: now in the family Myricaceae]
Reproductive system: DIOECY, TETRANDRY.

The sweet gale, *Myrica gale,* Linn., is a bushy shrub about a meter high. Its numerous reddish branches bear leaves that are alternate, oblong, denticulated at the tip, a bit firm, dull green above and strewn with yellowish resinous spots underneath. The male flowers, separate from the female ones, form small catkins at the ends of the branches before the leaves come out. The flowers on the female plants form small reddish sessile globules. The ovary is crowned with two styles and two stigmas. The fruit is a small monospermous capsule.

FLOWERS: in May and June.

RANGE: France, the forest of Rambouillet [*Translator's note:* about 50 km SW of Paris], in damp areas.

USES. The leaves of this tree have a pleasant but too penetrating an aromatic odor. When brewed like tea, they go to your head. In Sweden they're put into beer to give it flavor, but they're said to make it intoxicating. They're also placed among fabrics to keep insects away. Simon Pauli [*Translator's note*: Paulli, 1603-1680, a physician and botanist in Denmark] says that in Poland a decoction of sweet gale is used for getting rid of vermin on livestock.

The wax myrtle of Carolina and Louisiana, *Myrica cerifera* Linn., is a small tree that grows two or three meters high. Its numerous branches have a reddish bark. The leaves are alternate, lanceolate, oblong-oval, and have widely spaced pointed teeth from their midpoint to their tip. The fruits are small, rounded, and covered with a whitish powder.

The bayberry shrub, *Myrica pensylvanica,* not as tall as the preceding one, has been confused with it. The leaves are distinctly wider, less dentate, and often quite entire. They're flecked below with a myriad of tiny yellow spots. The newest leaves are rolled up underneath. The fruit, quite similar to that of the preceding species,

is slightly bigger. When they're crushed, the leaves of both plants release a most pleasant balsamic fragrance.

FLOWERS: in May. Like the other species, it's found in North America.

NOMENCLATURE. *Myrica* was the name the Greeks gave to the tamarisk, which like our sweet gale grows on the banks of streams. The word *galé* is derived from *gal,* or fat, oily. The English name for *Myrica cerifera* is candleberry myrtle.

USES. The fruit of the latter two species yields a greenish wax used for making candles. For this purpose, people in the north of America pick the berries in the autumn. They put them in cauldrons full of water and boil the whole lot, stirring and crushing the berries from time to time against the walls of the vessel to more easily dislodge the wax. They collect it with a spoon on the surface of the water and run it through a coarse cloth to get the impurities out. When no more wax comes off the seeds, they're removed with a skimmer and fresh ones are put in. They melt the wax a second time to get it purer and make cakes out of it. Eight pounds of seeds yield about a pound of wax. Bayberry candles don't make any smoke when extinguished.

CULTIVATION. The sweet gale is propagated from seeds as well as by dividing the plants. The wax myrtle is at risk in the north of France, but the bayberry yields flowers and fruit there. Either one of them is propagated from rooted shoots or by planting seeds in trays.

KEY TO PLATES.

542. Sweet gale. 1. Branch bearing female flowers. 2. Same, with male flowers. 3. Male catkin. 4 and 5. Female flower. 6. Fruit, transverse section.
543. Wax myrtle.
544. Bayberry. Section of fruit. 2. Same, intact. 3. Male flower. 4. Catkin of female flowers.

MYRTLE.

Family: MYRTACEAE.
Reproductive system: ICOSANDRY, MONOGYNY.

The common myrtle, *Myrtus communis*, Linn., grows to be only as tall as a small tree in northern parts of Europe; in Spain, Africa, and in the Levant it becomes a large tree. The trunk is straight, branchy, and bushy; the leaves are variable in size. They are opposite, almost sessile, lanceolate, tough, persistent, and have small transparent glandular spots. The flowers are white, solitary, occasionally in pairs, at the axils of the leaves. The calyx, in five sections, is reddish brown. The corolla has five rounded concave petals. There are a large number of stamens. The ovary adheres to the base of the calyx; it's surmounted by a style that's longer than the stamens. The fruit is a dark blue, almost black berry with three compartments and contains several osseous seeds.

FLOWERS: during the summer. The fruit ripens in the autumn.

RANGE: temperate climates of Asia and Africa, Italy, and southern France.

NOMENCLATURE. Several authorities believe that the name *Myrtus* came from the Greek word *Myrsine,* the name of a young woman of Athens renowned for her beauty. In German it's called *die gewœhnliche oder gemeine Myrthe.* Spanish, *arrayan.* Italian, *mirto, mortella.* Provençal, *murtra.* Hebrew, *hadas*.

HISTORY (**1**). The green of its foliage and the sweet fragrance

(1) This section is taken from the new *Treatise on Trees* by Duhamel, most of which I wrote, even though the prefatory inscription is signed by someone else.

that it emits were noted in earliest antiquity. The Israelites combined its branches with those of the palm tree during the festival of Tabernacles (**1**) [*Translator's note*: the ritual is still observed today].

Poets consecrated it to the goddess of love. The poplar, according to Virgil (**2**) pleased Alcidus, the grapevine delighted Bacchus, and the myrtle the beautiful Venus. Aeneas [*Translator's note:* son of Venus and Anchises] attended contests with his mother's myrtle around his forehead. The muse Erato who inspired love poetry and all the elegiac poets were crowned with its leaves. Virgil placed a grove of myrtle in the underworld where amorous souls would wander. However scholars don't agree on why the myrtle was consecrated to Venus. Some believe that at the moment of her birth the goddess was drying her beautiful hair near the seashore and was seen by satyrs. She escaped their view by hiding underneath myrtle trees. Others thought it's because she crowned herself with myrtle leaves after her victory over Juno and Pallas Athena.

USES. Myrtles are used for garden decoration in parts of France where they're not damaged by the cold. The berries and leaves are astringent; they're used as ingredients in several ointments.

CULTIVATION. They're propagated from seeds. But since they take root so easily from layers and cuttings, there's no need to consider growing them from seeds which always takes longer and is costlier.

(1) Esdras, chap. VIII, verse 15 [*Translator's note*: the citation is for *2 Esdras*. This is the Book of Nehemiah in the King James and Hebrew Bibles]. (2). Eclogues VII. (3). Aeneid, Book VI.

KEY TO PLATE.

1. Common myrtle flowering and fruiting. 2. Complete calyx. 3. Longitudinal section of calyx to show insertion of stamens. 4. 5. Berry. 6. Seed, enlarged.

HAWTHORN.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, TRIGYNY.

The hawthorn tree, *Mespilus oxiacantha, cratægus,* LINN., [*Translator's note:* now *Crataegus oxyacantha* or *Crataegus laevigata*] is a tree with a hard twisted trunk and is armed with sharp thorns. The leaves are glabrous and smooth, with indented toothed lobes. The white flowers are clustered in corymbs. The calyx is a single unit with five small teeth at the top. The corolla has five slightly concave petals. The stamens are very numerous and insert onto the calyx. The ovary is adherent and crowned by two styles and two stigmas. The fruit is a red rounded berry; it contains two osseous seeds.

FLOWERS: in May.

RANGE: France and a part of Europe.

NOMENCLATURE. Commonly, *hawthorn, noble thorn tree, Canadian hawthorn.* German, *hagedorn.* Danish, *hagetorn.* English, *white hawthorn.* Italian, *bagaia.* Russian, *bojarnia derewa.* Polish, *bodlak.* Bohemian, *hloh.*

The firethorn or burning bush, *Mespilus pyracantha,* LINN., [*Translator's note:* now *Pyracantha coccinea*], is a tree native to the southern provinces. The trunk is densely branched forming a thick bush. The bark is reddish brown. The leaves are oval lanceolate with finely denticulated margins; they're somewhat firm and smooth on top. The flowers are white or are slightly tinged with pink. They're arranged in axillary corymbs. The calyx has five sections, the corolla five petals, and there are a large number of stamens. The ovary is adherent and surmounted with five styles. It turns into a scarlet red, pulpy round fruit that contains three, four, or five osseous seeds.

FLOWERS: in May and June.

RANGE: France and southern Europe.

NOMENCLATURE. It got the name burning bush because the vivid red of its fruit at the end of autumn makes it look as though it's on fire. *Pyracantha* comes from *pyr,* fire, and *acantha,* thorn. German, *gedornte mispelbaum*. English, *evergreen thorn*.

USES. Hawthorns are used for making hedges around fields and gardens. The thorns provide protection and the pleasantly scented flowers add ornamentation. The burning bush is used for decorating landscaped gardens and large parterres where it makes an impressive sight during the autumn and a part of the winter. The wood of these two trees is hard, compact, and takes on a beautiful finish.

CULTIVATION. There are several varieties of the first species; the pink double-flowered one is in greatest demand. These two hawthorns are propagated by seed planting, grafting, and by layering. They adapt well to all kinds of soil but they prefer soil that's looser rather than heavier.

KEY TO PLATES.

1. Hawthorn tree. 2. Calyx, stamens and pistil. 3. Fruit. 4. Seed.
1. Firethorn. 2. Calyx. 3. Corolla and stamens. 4. Stamens and pistil. 5. Section of fruit. 6. Seeds.

MEDLAR.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, PENTAGYNY.

The medlars or thorn trees constitute an attractive and a useful genus. They have elegant foliage and pretty clusters of flowers followed by fruit that usually is red and that is conspicuous in autumn in almost all of our parks. Several species are armed with long thorns which makes them most suitable for forming hedges. M. Thouin Sr., who contributed so much to the cultivation and acclimatization of foreign trees, used several thorn trees at the Museum of Natural History, despite its dry ground, as examples of hedgerows and barriers that are impenetrable to any kind of animal.

The common medlar, *Mespilus germanica,* Linn., is a large shrub of uneven habit equipped with thorns that are lost when it's cultivated. The leaves are lanceolate, cottony underneath and green above. The white flowers are sessile and solitary. The fruit is yellowish gray.

FLOWERS: in June.

RANGE: the woodlands of France and Europe.

NOMENCLATURE. German, *mespel, mespelein*. Danish, *mispeltra*. English, *the Dutch medlar*. Italian, *nespolo*. Russian, *tschiski*. Bohemian, *rysspule*.

The scarlet hawthorn, *Mespilus coccinea.* Desf., [*Translator's note:* now *Crataegus coccinea*] is a small tree equipped with long thorns that are lost when it's cultivated. The leaves are oval, heart-shaped, angular, and lightly toothed. The flowers are white and form clusters. They have only nine stamens, an unusual exception in the Rosaceae family. The fruit is a beautiful red berry.

FLOWERS: in April.

RANGE: Virginia; naturalized in Europe a long time ago.

The common cotoneaster, *Mespilus cotoneaster,* Linn., [*Translator's note*: now *Cotoneaster integerrima*] is a small, twisted shrub. The leaves are oval, entire,

and cottony underneath. The flowers, in axillary clusters, are pinkish white. The fruit is red.

FLOWERS: in April and in June.

RANGE: southern France.

USES. The common medlar has edible fruit. The wood is hard, supple, reddish with a fine grain, capable of a beautiful finish and most suitable for lathe work. It's used for making canes and flail-rods. The scarlet hawthorn is very suitable for creating hedgerows around fields and gardens. It also can be left to grow as a tree. Its fruit makes a lovely sight in late autumn.

CULTIVATION. The trees are propagated from rooted suckers, by grafting, and from seeds that normally only come up in the second year. They do well in almost all kinds of soil.

KEY TO PLATES.

470. Common medlar. 1. Complete flower.

471. Scarlet hawthorn. 1. Complete flower. 2. Same, longitudinal section. 3. Complete fruit. 4. Same, transverse section to show the seeds.

472. Common cotoneaster. 1. Fruiting branch. 2. Longitudinal section of flower. 3. Transverse section of flower to show the seeds.

BUCKTHORN.

Family: BUCKTHORN FAMILY. [*Translator's note*: now in family Rhamnaceae].
Reproductive system: PENTANDRY, MONOGYNY.

The common buckthorn, *Rhamnus catharticus*, Linn., is a large common shrub in hedges and woodlands, colloquially known as black plum, town thorn bush. Its bark is smooth and the wood is yellowish. The leaves are alternate, petiolate, rounded or oval, with finely toothed margins and smooth on both sides. The calyx has four or five sections. The corolla has four or five small petals, sometimes none at all. There are four or five stamens. The ovary is free and becomes a berry with two or four compartments and four seeds.

FLOWERS: in May and June.

RANGE: France and Europe.

NOMENCLATURE. German, *gemeine kreuzdorn, kreuzbeere*. English, *purging buckthorn*. Russian, *pridoroschnaja igolka*. Polish, *szaklak krzewina*. Hungarian, *festo kokeny*.

USES. The fruit of the buckthorn is quite a powerful purgative, but a very frequently used medicinal syrup prepared from it is milder. This treatment is suitable mainly for hardy individuals. The inner bark likewise is a purgative, but it isn't used. The berries yield a yellow color when picked before they're ripe. Sap green [*Translator's note*: a green pigment also called bladder green] also prepared from this fruit is sometimes used by painters of miniatures.

The evergreen buckthorn, *Rhamnus alaternus,* Linn., is a shrub that grows eight or ten feet tall. Its evergreen branches have leaves that are petiolate, oval or oblong, firm, smooth, and yellowish with dentate margins. The greenish yellow flowers are situated at the leaf axils. They have five small petals and five stamens. The fruit is a small red berry.

FLOWERS: in April and May.

RANGE: the southern provinces. Cultivated in the vicinity of Paris.

NOMENCLATURE. *alaternus* comes from *alternus*, because the leaves are alternate. Spanish, *alaterno*. Portuguese, *aderno*.

USES. Several varieties of evergreen buckthorn are cultivated for ornamentation of gardens and winter groves. The variety with variegated leaves is exceptionally pretty. The wood is hard; it's used in cabinetry.

CULTIVATION. Buckthorns are propagated from seeds, by layering, and by grafting. They do quite well in all kinds of soil. However the evergreen buckthorns, especially variegated varieties, are vulnerable in the north of France; they have to be placed in sheltered locations.

KEY TO PLATES.

Common buckthorn. 1. Complete fruit. 2. Same, opened to show the seeds. 3. Detached seed. 4. Same, transverse section to show the embryo.

Evergreen buckthorn. 1. Flower before opening, enlarged. 2. Same, complete and open. 3. Berry. 4. Same, transverse section. 5. Branch with fruit.

HAZEL.

Family: AMENTACEAE. [*Translator's note*: now in Corylaceae or Betulaceae.]
Reproductive system: MONOECY, POLYANDRY.

The common hazel, *Corylus avellana,* Linn., is a shrub that grows about twenty feet tall. The stems are straight and branchy and the bark is grayish. The leaves are alternate, petiolate, heart-shaped, toothed, and somewhat rough to the touch. The male and female flowers are separate on the same plant. The male flowers form an elongated pendent cylindrical catkin consisting of imbricate scales that are divided into three unequal segments. They're in place of a calyx for the eight stamens that insert at their base. The female flowers are red, sessile, and are situated at the ends of the shoots; several join together in the same bud. Each flower has a calyx consisting of two large, leathery upright leaflets lacerated on the margins and containing one, infrequently two, seeds.

FLOWERS: in February and March.

RANGE: France and part of Europe.

NOMENCLATURE. Some authorities hold that the name *Corylus* is derived from a Greek word meaning helmet, hood, because of the cap formed by its calyx. In Old French *corylus* was shortened to *core,* and subsequently became *coudrier, coudre* [*Translator's note*: other French names for the hazel]. German, *haselstaude, haselnuess*. Dutch, *hazelaar, haselnoot*. English, *hazel-nut*. Italian, *nocello, nocciuolo*. Russian, *oreschnik.* Hungarian, *mogyoro-fa*. Armenian, *frandik*.

USES. The hazel's wood is suitable for basket-making. It's used to make hoops and wattles. It provides rods for holding up lines. In Saint-Claude boxes are made out of it that have a pretty pale flesh-color. It's used in carpentry and in cabinetry in Paris. Reduced to charcoal, it's used as an ingredient in gunpowder.

Compressing the seeds or the kernels yields a very sweet oil. The Chinese are said to put it in the tea they drink;

it's very rarely used in Europe. The nuts are eaten dry when they're green. They have a pleasant flavor, but too many of them will give you indigestion. A variety known as the big hazelnut sometimes appears for dessert at the best tables; confectioners make sweets out of them by coating them with sugar.

CULTIVATION. The hazel is propagated in seed beds in February after the seeds had been stored in dry sand, by rooted suckers that are separated in November, and lastly by layering. It does well in all kinds of soil, but it has a preference for loose and sandy soil in the shade next to a stream. Several known varieties include: 1°. small white fruit; 2°. oblong red fruit; 3°. very big, round fruit; 4°. fruit in clusters.

KEY TO PLATE.

491. Common hazel. 1. Flowering branch. 2. Female flower bud. 3. Scale of male flower, exterior view. 4. Same, interior view with stamens. 5. Anther, enlarged.

SEVILLE ORANGE.

Family: HESPERIDIAE.[*Translator's note*: now Rutaceae.]
Reproductive system: POLYADELPHY, ICOSANDRY.

The cultivated Seville orange tree, *Citrus aurantium,* LINN., originally from India, grows in open ground in several southern provinces of France and it appears to be naturalized there. The trunk, about fifteen feet high, has limbs and branches that form a rounded top. The leaves are alternate, persistent, oval-lanceolate, very entire, and articulated on their petiole, which has a leaf-like wing. The flowers are white, fragrant, and form clusters. The calyx is small with five lobes; the corolla has five oblong petals. An unspecified number of stamens are joined at their filaments into two or more bundles and insert between the calyx and a sort of platform supporting a free ovary that's crowned with a style and a rounded stigma. The fruit is a round hesperidium; its rind contains a very aromatic essential oil. It's divided by membranous partitions into several internal compartments, each one of which contains several seeds.

FLOWERS: in June, July, and sometimes during another part of the year.

RANGE: the East Indies.

NOMENCLATURE. German, *der pomeranzenbaum, die pomeranze*. Dutch, *orangeboom*. Danish, *pomeranstræe*. English, *the orange tree*. Italian, *melarancino*. Portuguese, *larangeira*. Russian, *pomeranzowoe derewo*. Hungarian, *narants*. Arabic, *narendj hœlu*. Provençal, *laurangié*.

USES. Everyone is familiar with the fragrance of its flowers and the delightful sweet flavor of its fruit. One variety

that has bitter fruit puts out the most fragrant and beautiful flowers. It's also the favorite in gardens around Grasse and Nice [*Translator's note*: centers of the perfume industry in France] where it's highly productive.

CULTIVATION. In the north of France the tree is grown in frames to keep it sheltered from severe cold. It can be propagated by planting its seeds in March or April in trays set into a moderately warm hotbed. But previously grafted very hardy plants brought from Provence enable one to enjoy them sooner.

KEY TO PLATE.

1. Seville orange tree. 2. Pistil with a stamen showing its insertion.
3. Stamens.

OSYRIS.

Family: ELEAGNACEAE. [*Translator's note:* now in family Santalaceae].
Reproductive system: DIOECY, TRIANDRY.

The white osyris, *Osyris alba*, Linn., is a shrub of the southern provinces that grows two or three feet high and has a very branchy stem. The leaves are sessile, oblong, pointed, and very entire. The small yellow flowers are clustered at the ends of the stems and branches. They are dioecious and have a pleasant scent. The male flowers have a colored monophyllous calyx with three oval sections that are open, and three stamens. The female ones have an ovary that's adherent to the calyx and crowned with three stigmas. The fruit is a rounded red berry that terminates in an umbilicus and contains a globular kernel.

FLOWERS: in May and June.

RANGE: southern France, around Montpellier. I've found that they're plentiful close to Grasse and Antibes.

NOMENCLATURE. According to Pliny, *Osyris* was the Egyptian name for a sacred plant that cured all ills. The Romans used the same name for a bush that had long flexible branches; we know no more about it than we do about the Egyptian plant mentioned by Pliny. In colloquial French, *le rouvet.*

USES. There's nothing special about this plant, however it's cultivated in many gardens as a curiosity. In the southern provinces the branches are used to make brooms.

CULTIVATION. In the north of France the osyris is kept in conservatories, where it needs no more than ordinary care.

It's difficult to maintain it in gardens in Paris. It grows naturally in loose, dry, and sandy soil.

KEY TO PLATE.

709. White osyris. 2. Male plant. 3. Same, female. 3. Complete male flower, enlarged.

JERUSALEM THORN.

Family: BUCKTHORN FAMILY. [*Translator's note*: now in family Rhamnaceae].
Reproductive system: PENTANDRY, TRIGYNY.

The Jerusalem thorn, *Paliurus aculeatus,* is a large shrub of southern Provence, where it's known as *argalou, porte-chapeau* [*Translator's note:* i.e. hatstand]*, arnaveou.* It has smooth bark and spreading flexible branches that have two very hard thorns of unequal length at their insertion. The leaves are alternate, petiolate, oval, lightly toothed, smooth, and have two thorns, one of which is recurved, at their base. The yellow flowers form small clusters at the leaf axils. The calyx consists of five sections with a fleshy disk inside on which five petals and five stamens insert, alternating with the sections. The disk surrounds an ovary bearing three styles. The fruit is a flattened dry drupe with three compartments and has a horizontal wing around the edge; it looks like a squashed hat.

FLOWERS: in June and July.

RANGE: the vicinity of Fréjus [*Translator's note*: on the Riviera], Languedoc, and southern Dauphiné.

NOMENCLATURE. *Paliurus* is the name of a place in Greek; it's a town in North Africa located opposite the island of Crete. Dioscorides, Theophrastus, and Athenaeus [*Translator's note*: Greek philosophers and writers on plants of the ancient world] spoke of a thorny tree by this name, but it's not one that's easily recognized. German, *christdorn, judendorn*. Dutch, *christdoorn*. English, *the common christ's thorn*. Italian, *spino crocefisci*. Russian, *tschischnik*. Kalmuk, *er totar*.

USES. The stem and leaves of this shrub are believed to be astringent. The thorns are numerous and very sharp, so the shrubs could be used to make very good hedges. For that they only need to be planted and staked parallel to each other.

They thrive in the worst soil and survive our winters. Virgil [*Translator's note*: Eclogues, 5, 39] mentioned this tree:

In place of gentle violet, and narcissus now forlorn,
The thistle grows, and the sharp Jerusalem thorn, etc.

CULTIVATION. This shrub is propagated from suckers and from seeds that sprout promptly, provided that their envelopes are stripped off before they're planted.

KEY TO PLATE.

54. Jerusalem thorn. 1. Complete flower, enlarged. 2. Fruit.

BUCKEYE.

Family: ACERACEAE. [*Translator's note*: now in family Hippocastanaceae.]
Reproductive system: HEPTANDRY, MONOGYNY.

The RED BUCKEYE, *Pavia rubra; Æsculus,* Willd., is a tree that grows five or six meters high. The leaves are opposite with three, four, or five oval-oblong finely denticulated digitations. The flowers are dark red. The calyx is tubular with five teeth at the top. There are four petals; they have an unguis as long as the calyx. They're connivent; two are narrower than the others. The fruit contains two seeds. It differs from that of the horse chestnut in that it has no spines.

FLOWERS: in May.

RANGE: Carolina and Florida.

NOMENCLATURE. German, *die pavie*. English, *the scarlet flowered horse chestnut*. Japanese, *totji noki*.

The HYBRID PAVIA, *Pavia hybrida*, is a tree that I first saw in M. Cels' garden. I think botanists still don't know about it. It came from seeds that Michaux Sr. brought from North America. I called it the hybrid pavia because of its resemblance to the two previously known species. The ones that bloom every year in M. Cels' garden are three or four meters high. They're still quite young, and since they have very vigorous shoots, there's reason to believe that they'll grow taller than the two other species. The stem is cylindrical and smooth with branches and opposite digitate leaves with oval-oblong smooth finely denticulated leaflets. The flowers, much larger than those of the other two species, are upright and a beautiful yellow. The calyx is tubular with five teeth; it's a vivid red and slightly hairy. The corolla has four petals; two of them are longer and narrower than the others. There are six stamens, more often seven. The fruit is similar to that of the yellow buckeye, only it's bigger.

FLOWERS: in June.

RANGE: North America.

The YELLOW BUCKEYE, *Pavia flava; Æsculus,* Willd., grows eight or ten meters high. The leaves are opposite, digitate with five oval-oblong leaflets or digitations, finely denticulated, and cottony on the inferior vein. The yellow flowers are arranged in bunches that are not very full. The calyx is tubular with five teeth. The corolla has four petals; two of them are narrower than the others. Their unguis is much longer that the calyx.

FLOWERS: in May.

RANGE: North Carolina.

USES. Buckeyes are cultivated in parks and in large gardens. They have elegant foliage and the flowers have a pretty color. The hybrid is the one of choice. Its flower clusters are erect and striking.

CULTIVATION. They're propagated from seeds, by layering, and by grafting. They've been acclimatized here for a long time and they're not harmed by our cold weather. But they still need to be sheltered when they're young. They're sometimes grafted onto the horse chestnut. They take very well, but the grafted plants don't last long because the horse chestnut grows a great deal more than the pavia. Moreover, they take on an unattractive shape.

KEY TO PLATES.

421. Red buckeye. 1. Calyx and pistil. 2. Pistil and stamen. 3. Four detached petals that form the corolla.

422. Hybrid pavia. 1. Complete flower, opened longitudinally. 2. Four detached petals that form the corolla. 3. Pistil.

423. Yellow buckeye.

SILK VINE.

Family: APOCYNACEAE. [*Translator's note*: now in family Asclepiadaceae.]
Reproductive system: PENTANDRY, DIGYNY.

The stem of the Grecian silk vine, *Periploca græca,* LINN., grows thirty or forty feet high. It's smooth, cylindrical, and very flexible. Without any tendrils, it winds around whatever support it encounters. The branches often are interlaced with one another. The leaves are opposite, petiolate, oval-lanceolate, with very entire margins, acuminate tips, rounded at the base, and almost shiny above. The flowers, in small corymbs, are situated at the ends of the branches. They're purple inside and yellowish green at the top. The underside is smooth and almost yellow. The calyx is small, persistent, and divided into five smooth oval-pointed teeth. The corolla, with short hairs, is divided into five elongated, linear, somewhat fleshy strips. Inside are five slender filaments as long as the petals and recurved inward at the top. The stamens are very short and terminate in bilobed anthers. The ovary consists of two parts with elongated tips forming the styles. It develops into two long cylindrical curved capsules that come together at their top. They contain flat overlapping seeds and are crowned by a very white soft downy feather.

FLOWERS: during August.

RANGE: Syria and the Greek islands.

HISTORY. This shrub has been grown in ornamental gardens in France and in parts of Europe for a long time. Clusius [*Translator's note*: Carolus Clusius, or Charles de l'Escluse, 1526-1609, a botanist and physician who lived in France and the Netherlands] and J. Bauhin provided an illustration and a description without giving its history, so it's difficult to determine when it first was introduced into our climate. The common name is Virginia silk tree.

USES. Its long flexible branches are used to cover arbors and to decorate walls, where its many beautiful purple flowers make a lovely sight. It has no known medical use. It's thought to be a poison that can kill dogs and wolves.

CULTIVATION. This is a very hardy shrub and it thrives in all kinds of soil. It's readily propagated by layering; the flexible branches make this procedure very easy. It's best situated in the sun; it blooms only very little in the shade.

KEY TO PLATE.

1. Garden silk vine. 2. Calyx and pistil. 3. Detached petal with a filament. 4. Fruit.

PERIWINKLE.

Family: APOCYNACEAE.
Reproductive system: PENTANDRY, MONOGYNY.

The stem of the greater periwinkle, *Vinca major,* LINN., is shrubby, rounded, and two or three feet high. The leaves, suspended on short petioles, are opposite, oval, heart-shaped, sometimes indented at the base, with entire margins that have a few hairs. The blue flowers are solitary at the axils of the leaves. The calyx has five sections that are ciliate on their margins. The corolla is marked with five grooves; the limb is split into five parts. The five stamens are enclosed in the tube. The style is topped with a widened flat stigma. The fruit consists of two long, pointed capsules. The seeds are flat and are fastened to a central receptacle.

FLOWERS: all summer long.

RANGE: the southern provinces, in woodlands.

NOMENCLATURE. *Vinca* or *pervinca,* from the Latin word *vincire,* to bind, because of its long strong stems. German, *grosses sinngrün.* English, *greater periwinkle.*

USES. The periwinkle is thought to be astringent, antipyretic and a vulnerary. In former times it was used to reduce menstrual flow; the prescribed dose was a decoction of a pinch or two of its leaves in a pint of water. Garidel [*Translator's note*: Pierre Joseph Garidel, 1658-1737] a noted botanist and physician in Aix en Provence, used it successfully to treat spitting up of blood. He boiled it with crayfish and gave the broth to the patient every morning over an extended period. These days it's rarely used medicinally. It's claimed that the crushed leaves applied to the breasts of wet nurses can restore milk production;

but women, especially among the common folk, say it has the opposite effect.

The leaves can be used for tanning leather. The bush deserves a place in parks and gardens. Its foliage always stays green; and sometimes it's variegated with yellow.

CULTIVATION. This plant likes cool, shaded spots. It's easily propagated from the plentiful shoots that it puts out.

KEY TO PLATE.

1. Greater periwinkle. 2.Calyx. 3. Open corolla. 4. Pistil.

DATE PLUM.

Family: EBENACEAE.
Reproductive system: POLYGAMY, DIOECY.

The date plum, *Diospyros lotus,* LINN., is a tree that grows about sixty feet high. The leaves are large, alternate, entire, beautifully green, and terminate in a point. They have small glandular spots on their undersurface, especially at the base. The flowers, situated at the leaf axils, are sessile. They're in groups of three or four on the male plants but are solitary on the female ones. The calyx is cup-shaped, with five teeth. The corolla, inserted into the bottom of the calyx, is monopetalous with four or five lobes. The eight stamens are situated at the base of the corolla; sometimes they're sterile. The ovary is free, topped by a style with four stigmas. It becomes a berry surrounded at its base by the calyx and divided into eight to ten monospermous compartments.

FLOWERS: in June and July.

RANGE: Italy; naturalized long ago in Languedoc.

NOMENCLATURE. *Lotus*, because it was thought to be like the *lotos* of the ancients whose properties were attributed to it. It was also called *guyacana*: it was reputed to have qualities similar to those of the guaiac tree. German, *der pseudolotus*. English, *European date plum*. Portuguese, *loto de Italia*.

USES. The fruit is edible; it's astringent and not very tasty, but it's recommended for dysentery and hemorrhages. In that case it has to be stewed with sugar, which reduces the astringency. Botanists of old believed that this was the fruit eaten by the lotophagi [*Translator's note:* a legendary people on the coast of North Africa whose diet of the lotus induced forgetfulness and indolence. Related in the *Odyssey*.] M. Desfontaines informs us that that was a species of jujube tree, *Rhamnus lotus*.

The wood of this tree isn't very hard, however it can be put to good use.

CULTIVATION. The tree is quite vulnerable to cold in the north of France, especially when it's young. Consequently one must take care to cover the base with litter until the tree is fully formed. It's propagated by planting the seeds in trays as well as by layers, which take root quite easily. It likes loamy, gentle, slightly cool soil of good quality. In Provence and in Languedoc it self-propagates by its shoots.

KEY TO PLATE.

Date plum. 1. Male plant. 2. Female plant. 3. Open corolla and stamens. 4. Complete flower.

PEAR TREE.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, PENTAGYNY.

The common pear tree, *Pyrus communis,* Linn., is a medium sized tree with upright limbs and on the wild trees, branches with thorns. The leaves are oval-lanceolate, pointed, smooth, and sometimes toothed. The white flowers form corymbiform clusters. The calyx has five lobes and the corolla five petals. A large number of stamens insert into the calyx. The ovary is surmounted by five separate styles hairy at their base and terminating in five stigmata. The smooth fruit is turbinate, elongated at the peduncle. It has five compartments; each one contains two cartilaginous seeds.

FLOWERS: in April.

RANGE: the forests of France, where it first was obtained. Many varieties, obtained by cultivation, are rather distinctive in shape and in flavor.

NOMENCLATURE: According to M. de Theïs, *Pyrus* comes from the Celtic word *peren.* German, *birnbaum, birne*. English, *peartree*. Dutch, *peereboom*. Spanish, *el peral*. Russian, *gruscha*. Hungarian, *kortvely*. Arabic, *kummitry*.

USES. Everyone is familiar with the qualities and virtues of a number of varieties of cultivated pears. There are about thirty or forty of them. The rest, numbering more than two hundred, are only for table decoration. Some of them are scarcely any better than wild fruit in the forest.

The wood of the pear tree is heavy, strong, and has a reddish color. It has a fine grain. It takes on a black stain very well, with the result that it looks so much like ebony that it's hard to tell the difference. It's sought after and highly valued by lathe workers and by cabinet-makers.

Duhamel says that next to the wood of the service tree, it's the best kind for making woodcuts.

The cottony pear tree, *Pyrus polveria*, Linn., is a tree about twelve or fifteen feet tall. Its trunk is covered with grayish bark. The leaves are oblong, oval, with serrate margins. They're green on top, whitish and cottony underneath. The white flowers are followed by small reddish fruit suspended on a long peduncle.

FLOWERS: in May.

RANGE: the forests of Germany; naturalized in our parks.

NOMENCLATURE. German, *lazerolenbirne, mispelbirne*. English, *woolly-leaved pear-tree*.

CULTIVATION. Pear trees are propagated by sowing their seeds and by planting young quince trees on which fine varieties of pears are grafted. Seed planting yields new varieties that sometimes are superior to those that we already have. As far as possible, pear trees should be planted in good quality soil that's loose rather than heavy.

KEY TO PLATES.

Common pear tree. 1. Complete flower. 2. Intact fruit. 3. Same, transverse section.

Cottony pear tree. 1. Transverse section of fruit.

APPLE TREE.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, PENTAGYNY.

The common apple tree, *Malus communis,* Lam., is a medium sized tree that gets to be fairly tall depending on the soil in which it grows. Its branches are irregular and on wild trees they have thorns. The leaves are oval, slightly dentate on the margins and cottony underneath. The large flowers are white, tinged with pink, and are formed in umbels. The calyx is hairy and has five sections. The stamens are very numerous and insert into the calyx. The ovary is adherent and is surmounted by five styles that are fused at their base. It develops into a fruit that varies in size and shape.

FLOWERS: in May.

RANGE: France and a large part of Europe.

NOMENCLATURE. *Malus* is from *mel* or *mal,* Celtic for apple. German, *der apfelbaum, apfel, appel*. Danish, *aeble*. English, *apple-tree*. Spanish, *manzana*. Russian, *jablon*. Hungarian, *alma*. Arabic, *tyffah*.

The Chinese flowering crab apple, *Malus spectabilis,* is a shrub cultivated in parterres and in gardens. It's three or four feet high. The leaves are oval, oblong, toothed, and smooth on top. The flowers are large, numerous, pink, and umbelliform. The corolla consists of petals that have an unguis longer than the calyx. The ovary is surmounted with styles that have a woolly base.

FLOWERS: in early spring.

RANGE: China; introduced into England in 1780 and from there into France.

USES. Everyone knows the benefits of growing apple trees,

especially in the provinces of France where grapes won't ripen. There's a difference between eating apples and cider apples. About two hundred varieties of them are cultivated, but as with almost all other cultivated species, there's a lot of confusion among names of apples. After quite a long stay in several parts of Normandy, I'm convinced that in some districts several different apples have the same name, and that depending on the district where they're produced, the same or very slightly different varieties get different names.

Apples are refreshing and are gentle laxatives. Sometimes they're prescribed in potions. When cooked they may be given to the ailing and the convalescent.

A cubic foot of dry wood of the apple tree weighs about twenty-six kilograms. It's hard, supple, smooth, has color, and can take a fine finish. It's much in demand by lathe workers and cabinet-makers.

The Chinese flowering crab apple is a charming tree. It looks very beautiful in our planting beds in early spring.

CULTIVATION. The apple tree does well in soil of good quality. The best kinds are propagated by grafting them on plants raised from seeds. The Chinese flowering crab apple tree is propagated by grafting it on the *Doucin* or on the Paradise apple, or even on wild stock.

KEY TO PLATES.

747. Common apple tree. 1.
748. Chinese flowering crab apple tree. 1. Stamens and pistils. 2. Fruit.

PLUM TREE.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, MONOGYNY.

The blackthorn, *Prunus spinosa,* Linn., is not a very tall tree but it's a very branchy one; it's often a bush tree. The branches, terminating in sharp points, bear leaves that are oval-lanceolate, pointed, and finely toothed on the margins. The flowers are white, solitary, pedunculate, and bloom before the leaves appear. The calyx has five lobes and the corolla five petals that often are indented at the top. A large number of stamens insert into the calyx. The ovary is free, surmounted by one style and one stigma. It turns into a rounded oval fruit, green at first and a deep blue when ripe. It contains an osseous pit that's flattened, pointed, grooved, and irregular at the edges.

FLOWERS: in March and April.

RANGE: hedges and uncultivated areas in France and Europe.

NOMENCLATURE. German, *der schwarzdorn, slehen.* English, *black-thorn.* Dutch, *sleedorn.* Italian, *prugnolo.* Russian, *tern, ternik.* Hungarian, *kokery-fa.*

The garden plum tree, *Prunus domestica*, Linn., is a not very tall tree with spreading branches and brown bark. The leaves are alternate, oval-oblong with dentate margins and are slightly downy underneath. The flowers are white, solitary or in pairs. They appear at the same time as the leaves. The calyx, corolla, stamens, and pistil resemble those of the preceding species. The fruit is rounded or oval depending on the variety. It's covered with a fine glaucous powder called bloom. This is never found on species of the cherry tree genus in which Linnaeus had included the plum trees.

FLOWERS: in April and May.

RANGE: France.

NOMENCLATURE. German, *pflaumen*. Dutch, *pruim boom*. English, *plum-tree*. Italian, *prugno*. Spanish, *ciruelo*. Russian, *sliwnik*. Polish, *sliwina*. Hungarian, *szilva*.

USES. The blackthorn's bark is astringent and antipyretic. Decocted in lye, it yields a red dye. It also can be useful for tanning leather. The wood is used as fuel for ovens.

The garden plum tree has hard, veined wood with a reddish color. It's used by cabinet-makers and lathe workers. Plums are eaten fresh or in preserves, pastes, and marmalades. They're laxatives and they're refreshing. They're included in several pharmaceutical preparations. There are about fifty cultivated varieties.

CULTIVATION. Plum trees are propagated by grafting. But the pits must be planted to obtain suitable stocks. However, some varieties such as the perdrigon and damson plums are propagated by seed planting. The plum tree thrives quite well in all kinds of soil, but it prefers loose soil that isn't sandy.

KEY TO PLATES.

Blackthorn. 1. Intact flower. 2. Open calyx, stamens, and pistil. 3. Transverse section of fruit.

Garden plum tree. 1. Flowering branch. 2. Same, with leaves and fruit. 3. Open calyx, stamens, and pistil.

PITCH TREFOIL.

Family: LEGUMINOSAE.
Reproductive system: DIADELPHY DECANDRY.

The pitch trefoil, *Psoralea bituminosa,* Linn., is a bush of our southern provinces that grows about one meter high. The stem is straight, cylindrical, grooved and branchy. The leaves are on long petioles. They consist of three lanceolate leaflets that are very entire and slightly downy underneath. They're colored a deep blue. The peduncles as well as the petioles have entire, pointed bracts at their base. The calyx has five sections; it's persistent and hairy. The papilionaceous corolla has five distinct free petals. The ten stamens are joined together. The fruit is an oval monospermous pod concealed inside the calyx. It's compressed, has black bristles, and terminates in a protruding beak.

FLOWERS: almost all summer long.

RANGE: southern France.

NOMENCLATURE: commonly, bituminous trefoil, Jesuit's tea.

The glandular psoralea, *Psoralea glandulosa,* Linn., is a bush that originated in Peru and has been cultivated for a long time in almost all collections. The leaves are on quite long petioles that are rough to the touch. They're made up of three lanceolate, entire, pointed leaflets. The blue flowers are in spikes set on long peduncles that originate at the leaf axils and have pointed stipules. The calyx has five teeth, one of which is larger than the others. The corolla is papilionaceous. The fruit is a monospermous pod surrounded by the persistent calyx.

FLOWERS: from May until August.

RANGE: Peru, naturalized in gardens in the south of France.

USES. These two bushes are cultivated in major collections;

the first one can add decoration and variety to landscape gardens.

CULTIVATION. When it's in heavier rather than in looser soil, the pitch trefoil often propagates by itself. The other plant is more fastidious. In the north of France it's propagated by planting the seeds in a hotbed. Both bushes like warm and airy locations.

KEY TO PLATES.

462. 1. Enlarged calyx and stamens. 2. Corolla. 3. Intact fruit. 4. Same, longitudinal section.

463. 1. Enlarged calyx. 2. Complete flower, enlarged.

CORIARIA.

Family: TEREBINTH family? [*Translator's note:* now in Coriariaceae].
Reproductive system: DIOECY, DECANDRY.

The myrtle-leaved coriaria, *Coriaria myrtifolia,* Linn., is a shrub that I've found to be plentiful in the district around Grasse. It forms attractive grassy bushes in early spring. The flexible branches are quadrangular and have leaves that are opposite, simple, oval, entire, and smooth. The flowers are very numerous and form small clusters with bracts at the ends of the branches. They're monoecious, dioecious, or hermaphroditic. The calyx is simple and has five sections. There are eight or ten stamens that have short filaments. The pistil consists of five ovaries fused at the base and surmounted by five styles that are much longer than the stamens. The fruit is a capsule with five monospermous compartments.

FLOWERS: in April.

RANGE: the vicinity of Grasse and Nice and some parts of Languedoc.

NOMENCLATURE. *Coriaria* comes from *coriarius,* a currier, because its leaves are used for tanning leather. German, *der gerberstrauch, der gerberbaum*. Danish, *laedertraee*. Dutch, *rederboom*. English, *the myrtle-leav'd sumach*. Spanish, *rulda*.

USES. In the Levant the powdered leaves are used for dyeing morocco leather black and for tanning leather. The fruit is poisonous; when eaten it causes convulsions and a delirium that often is fatal. The leaves likewise are very injurious to livestock.

CULTIVATION. This bush is readily propagated from suckers and from seeds. However in our climate it's vulnerable to severe frosts.

In southern Provence and in Languedoc it grows naturally in hedges and in untilled areas.

KEY TO PLATE.

749. Myrtle-leaved coriaria. 1. Branch with fully developed leaves. 2. Clusters of flowers. 3. Hermaphroditic flower, detached and enlarged. 4. Female flower, enlarged. 5. Fruit, transverse section.

ROSE ACACIA.

Family: LEGUMINOSAE.
Reproductive system: DIADELPHY, DECANDRY.

The rose acacia, *Robinia hispida,* LINN., native to North America, has been naturalized over almost all of France for many years. It grows twelve or fifteen feet high. Its numerous uneven branches are frail, pendent, and are copiously covered, as are the peduncles, with reddish bristles. The leaves are pinnate with seven, nine, or eleven entire leaflets that are acuminate at the tip. The beautiful pink flowers are arranged in axillary pendent clusters. The calyx has a short peduncle and is bell-shaped with five unequal lobes. The corolla is irregular, papilionaceous, with a very large standard. There are ten stamens; nine are joined by their filaments into a tube and one is completely free. The ovary is crowned with a style and a stigma that's hairy anteriorly. The fruit is a flattened oblong pod containing several seeds.

FLOWERS: during June, July, and August.

RANGE: Carolina; naturalized in our parks and gardens.

NOMENCLATURE. Linnaeus named the *Robinia* genus in honor of a French botanist named Jean Robin. English, *the rose-acacia*. Spanish, *mata-raton*. Commonly, *pink acacia.*

USES. The branches of this tree bending under the weight of clusters of pink flowers create a most vivid impression in parks and in ornamental gardens.

CULTIVATION. It's grafted on the robinia false-acacia; one would like to be able to grow it on its own roots.

It's damaged by high winds as are almost all other robinias. Sometimes severe frosts injure and kill the branches.

KEY TO PLATE.

1. Rose acacia. 2. Calyx. 3. Stamens and pistil.

ROSEMARY.

Family: LABIATAE.
Reproductive system: DIANDRY, MONOGYNY.

In Italy and in Provence where it grows naturally, the rosemary, *Rosmarinus officinalis,* LINN., reaches a height of five or six feet; but it's not as tall in our gardens in the north of France. It's quite popular there because of the pungent aroma that emanates from all parts of the plant. The branches are long; they're brown or ash-colored. They have lots of narrow linear leaves that are firm, green above, whitish underneath, with slightly recurved margins in the cultivated variety. The flowers are axillary, with several together on the same pedicel. They're pale blue or white with bluish spots. The calyx is shortened at its top and bare at its entrance while it's maturing. It has two lips: the upper one is entire; the lower one has two teeth. The corolla is monopetalous and labiate. The upper lip has two lobes. The lower one, much larger, has five; two of them have very deep separations. Two stamens are inserted in the top of the tube of the corolla. The ovary is free; it has four sections; a long style with a bifid stigma emerges from between them. The fruit is a polyachene made up of four indehiscent lobes, each one containing a single seed.

FLOWERS: at the beginning of spring.

RANGE: Provence and a number regions in southern France.

NOMENCLATURE. German, *der rosmarin*. English, *rosemary*. Italian, *rosmarino*. Arabic, *klil*. Chinese, *yong tsao*.

USES. A very plentiful essential oil, used in the pharmaceutical and perfume industries, is extracted from the plant by distillation.

The leaves have a sharp taste and a strong, pleasing aromatic fragrance. They're used to make a distillate known as *eau de toilette* of the Queen of Hungary [*Translator's note*: a legend has it that the perfume was originally used by an elderly queen of Hungary in the fourteenth century for its curative and rejuvenating powers. As a result, a prince of Poland sought her hand in marriage].

Rosemary is thought to be a tonic, a cordial, a cephalic remedy, and a stomachic.

CULTIVATION. It's very easily propagated from cuttings taken in the spring, but in the north of France it's sensitive to the cold, and a hard frost often ruins its branches. Consequently it should be set against a south-facing wall or hedge. In the southern provinces it propagates on its own and it's useful for constructing hedges that are never damaged by the cold.

KEY TO PLATE.

1. Rosemary. 2. Intact calyx. 3. Open calyx and pistil. 4. Open corolla and stamens.

DEWBERRY.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, POLYGYNY.

The stems of the EUROPEAN DEWBERRY, *Rubus caesius. Linn.* are recumbent reddish woody shoots protected with thorns. The leaves consist of three oval leaflets finely but unevenly toothed. The flowers are white; they're supplanted by bluish berries consisting of a few seeds and covered with a bloom like that on plums.

FLOWERS: in spring.

RANGE: France and Europe, in hedges and on roadsides.

NOMENCLATURE. German, *der bocksbeerenstrauch, traubenbeere*. English, *the dewberry*. Dutch, *blaauwe brummelen*. Spanish, *zarza azul*. Italian, *rovo minore*. Russian, *komoinka*. Hungarian, *szederj*.

The SOUTHERN DEWBERRY, *Rubus trivialis, Mich.* has stems and petioles that are reddish and covered with thorns. The leaves have five uniformly dentate oval leaflets. The flowers are white, solitary in the leaf axils, and have long pedicels.

FLOWERS: in the spring.

RANGE: North America.

USES. Dewberries make useful shrubs for hedges and for roadsides, but their problem is that they overgrow and spread out too much. Children love fruit

from almost all of the dewberries in our region, especially the ones with blue fruit, because they aren't so bland and have a nice flavor.

CULTIVATION. All of the dewberries are easily propagated from the abundant runners that they put out. But cultivating them often is bothersome. They need a special place where they can spread out without troubling other plants.

KEY TO PLATES.

European dewberry. 1. Stem. 2. Calyx, stamens, and pistils. 3. Whole fruit.

Southern dewberry. 1. Branch. 2. Whole fruit.

PURPLE FLOWERING RASPBERRY.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, POLYGYNY.

Of all the naturalized ornamental plants in our climate, the purple flowering raspberry, *Rubus odoratus,* LINN., is one of the most beautiful with its broad foliage and its pretty flowers. It's commonly called bramble, a name we use only for useless and troublesome plants. That's because the characteristics of its flowers and fruit resemble those of the common bramble. But instead of being a creeping plant full of thorns, it forms an upright shrub four to six feet tall subdivided into diffuse branches. There are no thorns on the stem; instead it's covered with very many stiff hairs. The leaves are alternate, petiolate, simple, very large, smooth on both sides, green above and whitish underneath. They're palmate, or rather divided into three or five pointed lobes that are irregularly toothed on the margins. They're borne on upright petioles that are grooved, hairy, and the same length as the leaves. The flowers are arranged in small, terminal axillary corymbs. The calyx has five oval sections that terminate in a subulate point. The large corolla is a beautiful violet-pink and consists of five oval petals that are almost round and very open. There are a large number of stamens and pistils. They're followed by deep red globular fruits joined together in the form of a berry.

FLOWERS: during June and August.

RANGE: the high mountains of Canada. The shrub has been naturalized in Europe for about a century. It was cultivated in England in 1739.

USES. There's no known medical use for this plant. It can add variety to our parterres and to parks.

CULTIVATION. This shrub is propagated most easily from its suckers, which always are very plentiful. It doesn't like locations that are too sunny; it grows much more beautifully in a cool, shady place.

KEY TO PLATE.

1. Purple flowering raspberry. 2. Calyx with a few stamens. 3. Intact fruit.

ROSEBUSH.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, POLYGYNY.

The red-leaved rosebush, *Rosa glauca,* DESF., [*Translator's note:* also called *Rosa rubrifolia*] has a reddish stem about three feet high with recurved thorns. The leaves have seven oval-oblong, smooth, serrate leaflets. The red flowers are suspended on short cylindrical pedicels. The calyx terminates in five ribbons that are longer than the petals. Three of them are bare; the other two have one or two small beards. The fruit is a smooth ovoid berry that turns purple red when completely ripe.

FLOWERS: May and June.

RANGE: Dauphiné, the Auvergne, and the Pyrenees.

The Scotch rosebush, *Rosa pimpinellifolia,* LINN., ordinarily grows two or three feet high and forms a dense bush. The stems are protected with thorns. The leaves have seven or nine dentate oval rounded leaflets. They're quite similar to those of the garden pimpernel. The flowers are white with some reddish spots. The calyx has five smooth strips; they're entire and are all the same size. The corolla has five petals indented at the tips. The fruit is a smooth rounded berry that's deep red when completely ripe.

FLOWERS: May and June.

RANGE: barren, stony ground in the southern provinces.

The French rosebush, *Rosa gallica,* LINN., grows four or five feet high. The stem has small thorns; the branches and peduncles are bristly. The leaves have four or five dentate leaflets that are green on top and whitish underneath.

The terminal leaflet is suspended on a very long peduncle; the others are sessile. The pink-purple flowers are set on bristly peduncles. The calyx is globular, surmounted by five simple strips. The fruit is a slightly hispid rounded berry.

FLOWERS: in May.

RANGE: France and part of Europe.

USES. All rose bushes are decorative in gardens. The one with glaucous leaves [*Translator's note*: i.e. *R. glauca*, above] makes a pleasant contrast in a collection. The French rosebush is often used medicinally; its flowers are included in a large number of pharmaceutical preparations. The petals are used to make sugar of roses, honey of roses, rose vinegar, several electuaries, etc. They're prescribed as astringents for hemorrhages, loose bowels, and for all ailments resulting from atony. They're also used as poultices and for hot compresses.

CULTIVATION. Rosebushes grow everywhere, but they prefer gentle soil and an open area. They're propagated from their shoots and suckers; the best varieties are propagated by grafting on wild rosebushes.

KEY TO PLATES.

1. Red-leaved rosebush. 2. Calyx, stamens, and pistil. 3. Fruit.
1. Scotch rosebush. 2. Calyx and stamens. 3. Detached petal. 4. Fruit.
1. French rosebush. 2. Calyx. 3. Same, longitudinal section.

ROSEBUSH.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, POLYGYNY.

The CABBAGE ROSEBUSH, *Rosa centifolia,* Linn., has an upright stem armed with thorns. The leaflets are large, oval, dentate, and are borne on thornless petioles. The flowers have a bristly peduncle; the ovary is oval-shaped.

For a number of years travelers have brought back many plants from all over the world that are exceptional for their bright colors and extremely diverse forms. But none of them has been able to present us with a shrub that combines as many charms as does the rosebush. Its foliage, elegantly fashioned and with the most beautiful greenery, rounds out into a bush as though it were a throne for the queen of the flowers. Poets of all lands and in all ages have celebrated the rose. It has been the subject of the most delightful metamorphoses and the loveliest of images. It's clear from books in Hebrew, Persian, Greek, and Latin that the rose has charmed people of all nations with its freshness and exquisite fragrance. Even its colors are thought to be of divine origin. It's said that drops of the blood of the goddess of love fell upon a white rose to give it the carnation color that enchants us so. Ah! - the poets say - whose blood other than that of Venus could have colored the rose?

In several religions roses were selected to adorn the altars of the gods. As long as customs remained simple and the first fruits and most beautiful flowers were offered to the Eternal, roses and ears of wheat spared the blood of animals. In Rome crowns of roses were used in feasts and on solemn holidays. During funerals roses were mingled with dreary cypress wood and were strewn on the graves of the departed

as a mark of their good name and of the pleasant and cherished memories that they left behind for their friends.

FLOWERS: This rosebush blooms in June, and sometimes at the end of May. You can get flowers in September if you take care to trim the buds before they open. Gardeners raise the young plants in pots in a hothouse to get flowers at the beginning of spring and even at the end of winter.

RANGE: The country where this rosebush grows in the wild is unknown. Theophrastus says for sure that it's on Mt. Pangaíon where the inhabitants of Phillippi [*Translator's note:* an ancient site in Macedonia] went to look for cabbage rosebushes to bring home. But he went on to say that the roses were small and not very fragrant, which makes one think that he was talking about a different species. At all events it seems clear that this rosebush should be thought of as a distinct species and not as a cultivar. M. Dupont noticed one of the plants whose flowers had very few petals. He collected the fruit, planted it, and got a rosebush with simple flowers that differed from all previously known species.

NOMENCLATURE. According to M. de Théis [*Translator's note*: probably Baron de Théis, 1765-1842, who published a botanical glossary in 1810.] the name *Rosa* comes from the Celtic word *rhos,* which gave rise to almost all names for the rose in the very oldest languages such as Greek, Slavonic, etc. Its root, *rhodd* or *rhudd,* means red in Celtic. German, *die Centifolienrose*. English, *the Hundred-leaved rose*. Chinese, *Ta-mui-hoa*. Cochin Chinese, *Hoa-houng-tau*.

The MOSS CABBAGE ROSEBUSH, *Rosa muscosa,* Hort. Kew., has branches, peduncles, and calices that are covered with a sticky nap that looks a lot like moss. It adheres to the fingers when touched. The ovaries are oval-shaped. The thorns on the branches and peduncles are thin and straight. The leaflets, three or five in number, are oval and serrate.

FLOWERS: in May and June.

RANGE: Its country of origin is unknown. Miller says it's been under cultivation only since 1727.

The POMPON CABBAGE ROSEBUSH, *Rosa burgundiaca,* Desf., has small double flowers. The lower leaves have five leaflets, and the upper ones three. The ovaries are hairy; the stems have straight thorns.

FLOWERS: in June.

RANGE: the vicinity of Dijon, where it was discovered in 1735 by a gardener cutting wood on a mountain outside the town.

USES. The cabbage rosebush is a beautiful sight growing as a bush in a garden. But it still can be trimmed and shaped in different ways. Around Paris it's cultivated on a large scale for medical purposes and for the perfume industry. The petals, dried before the flowers are open, are used for poultices, compresses, and as vulneraries, astringents, and tonics. A number of preparations are made from roses, such as preserves, honey and rose vinegar. The species used most in medicine is the French rose, already discussed in this work.

The moss cabbage rosebush seems to be even more appropriate than the one above for decorating flower beds. The fuzz that appears with the flowers gives them a picturesque veneer. When touched it imparts a sweet scent to the fingers.

CULTIVATION. Generally speaking, rosebushes prefer coolness and shade. They can be propagated from seeds to obtain new varieties, but a number of them don't produce any. Since the seeds normally don't come up until the second year, it's better to propagate the finer ones by grafting to enjoy them sooner. Only bud shield grafts are used. Cabbage rosebushes are propagated easily from root suckers.

They're pruned only to keep the branches fresh, so that there aren't any bare ones at the base. The moss cabbage rosebush is almost never grown from a seedling; they're obtained by grafting on wild rosebushes. It's noteworthy that if tilling and pruning are neglected, the nap covering the branches thins out and even disappears. The pompon cabbage rosebush is easily propagated, but it must be provided with loose fertilized soil like that in a kitchen garden. If left on its own it will degenerate. Several varieties are cultivated by flower gardeners; the principal ones are the large pompon, the actual burgundy rose, and the little pompon.

KEY TO PLATES.

Moss cabbage rosebush. 1. Intact calyx.
Pompon cabbage rosebush. 1. Calyx and stamens.

ROSEBUSH.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, POLYGYNY.

The Champagne rosebush, *Rosa remensis,* Desf. Arb., is a bush with foliage that's frequently thick and rounded. The leaves are small. The leaflets, five or seven in number, are green above, slightly whitish underneath, and are often edged with red teeth. The flowers are double, about the size of those of the pompon cabbage rosebush, and are not very fragrant. The fruit is oval and practically smooth. The peduncle is glandular.

FLOWERS: June and July.

The evergreen rosebush, *Rosa sempervirens,* Linn., is a shrub that grows to be twelve or fifteen feet tall when it's placed against a wall or some other support. The leaves are not deciduous like those of other rosebushes. They have five to seven shiny green lanceolate leaflets. The small white flowers have a musky odor. The fruit is oval and smooth. The stems and petioles are armed with thorns.

FLOWERS: June and July. It's a native plant like the one above.

The Alpine rose bush, *Rosa alpina,* Linn., grows four or five feet tall. The stem and petioles are devoid of thorns. The leaves have five to nine smooth, oval, dentate leaflets. The dark red flowers, solitary or in pairs, are situated at the ends of the branches. The sections of the calyx are simple; the fruit is globular and pendent.

FLOWERS: August and September.

RANGE: The Alps, the Vosges, and the Pyrenees, in rocky ground.

The Virginia rose bush, *Rosa lucida,* Linn., grows about two meters tall and forms a thick bush. The leaves have two straight sharp red thorns at their base. They consist of five to nine oval-lanceolate leaflets that are a shiny green on top. The flowers, arranged in pairs, are a fairly deep pink and have petals that are slightly indented at the tip.

The sections of the calyx have no appendages. The fruit is globular, compressed, and slightly bristly.

FLOWERS: July and August.

RANGE: North America. Naturalized in our gardens since the beginning of the last century.

The field rosebush, *Rosa arvensis,* Linn., is a small, twisted, frequently trailing shrub. The stem and branches are smooth and have reddish hooked thorns. The leaves have five to seven ovoid dentate leaflets. In the center of each flower there's a disc from which extends a small column that terminates in opened stigmas. This feature sets this rosebush apart from all of the others.

FLOWERS: in June.

RANGE: around Paris and in several other parts of France.

USES. All of these rosebushes are decorative in gardens and in large parks. The Virginia rosebush is especially impressive because of its beautiful flowers that double under cultivation.

CULTIVATION. The same as for the other species. The Champagne rosebush is the only one that's a little more delicate.

KEY TO PLATES.

456. Champagne rosebush.
457. Evergreen rosebush. 1. Calyx, stamens, and pistils. 2. Fruit.
458. Alpine rosebush. 1. Calyx and stamens. Fruit.
459. Virginia rosebush. 1. Fruit.
460. Field rosebush. 1. Calyx and stamens. 2. Fruit.

ROSEBUSH.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, POLYGYNY.

The dog rosebush, *Rosa canina,* Linn., is a very common shrub in hedges around Paris. Its stems are straight, slender, and smooth. The branches are equipped with reddish hooked thorns that are wide at the base. The leaves consist of three, five, or seven oval serrate leaflets. The flowers are slightly pink. Three sections of the calyx are pinnatifid; two are entire. The fruit is oval and smooth.

The sweet briar, *Rosa rubiginosa,* Linn., grows to a height of three or four feet on branchy stems that bristle with slightly hooked thorns. The leaves consist of five or seven dentate oval leaflets. The undersides and margins of the leaves are covered with a reddish glandular down that unquestionably imparts a strong scent of *reinette* apple when they're bruised. The small flowers are light pink with indented petals. The fruit is an ovoid berry, most often with a glandular nap.

The cinnamon rosebush, *Rosa cinnamomea,* Linn., is a shrub growing four or five feet high on a stem with smooth cinnamon-colored bark and with hooked thorns that are set two or three together at the bases of the leaves and the branches. The leaves consist of five or seven oval leaflets finely denticulated on the margins. They have stipules that are wide, entire, and almost as large as the pedicels. The flowers are red and fragrant. The calyx has five entire sections that are slightly cottony on the margins.

The Scotch rosebush, *Rosa spinosissima,* Linn., [*Translator's note:* also designated *R. pimpinellifolia* (p. 0495 above)] is a bushy shrub about three feet tall. The stems are brown and are covered with thorns that are sharp and almost straight. The leaves consist of five, seven, or nine small, oval, smooth dentate leaflets. The flowers are white,

with petals that are entire or slightly indented at the top. The calyx has five short entire sections.

FLOWERS: in May and June, like the other species.

RANGE: France. The cinnamon rosebush grows naturally in the Auvergne and in the Vosges.

USES. The dog rosebush is the only one used in medicine. A preparation made from the fruit called *cynorrhodon* [*Translator's note:* Greek for dog rose] preserve is astringent and is prescribed for atonic diarrhea and stomach weakness. Some authorities claim that seeds separated from the pulp of the fruit used to make the preserves, called rose hips [*Translator's note: gratte-cul,* literally anal scratch], are laxatives and diuretics.

Bedeguar is a growth found on branches of this rosebush and on other wild species. It results from perforation by an insect [*Translator's note*: bedeguar, or rose gall, is caused by the gall wasp]. Formerly it was prescribed as a gargle for sores in the mouth and throat. Ashes of the bedeguar also were thought to be suitable for resolving scrofulous tumors. Nowadays it's rarely used in medicine.

CULTIVATION. These rosebushes are cultivated only in botanical institutes. They're readily propagated from suckers to be used as stocks for grafting unique or rare species or varieties with beautiful flowers.

KEY TO PLATES.

576. Dog rosebush. 1. Germinating plant. 2. Calyx and stamens. 3. Fruit.
577. Sweet briar. 1. Germinating plant. 2. Leaf enlarged and seen from below. 3. Calyx and stamens. 4. Fruit.
578. Cinnamon rosebush. 1. Calyx.
579. Scotch rosebush. 1. Germinating plant. 2. Calyx and stamens.

GREEN BRIER.

Family: ASPARAGUS FAMILY. [*Translator's note:* now Liliaceae family]
Reproductive system: DIOECY, HEXANDRY.

The Provence green brier, *Smilax aspera,* Linn., is a climbing plant with a slender, crooked stem covered with thin, yellowish thorns. The leaves are alternate, oblong, heart-shaped, with spines on the margins as well as on the posterior veins. At the base of the petioles, which are fairly long, there are small yellowish tendrils that the plant uses to attach to trees and to nearby plants. The male and female flowers are on different individuals. The calyx has six sections. The male flowers have six stamens; the female ones have an ovary crowned with three styles that turns into a rounded berry with two or three compartments. The flowers are at the ends of the stems.

FLOWERS: in July. The fruit ripens the following May.

RANGE: I've found this plant with a woody stem on old walls in the vicinity of Grasse.

NOMENCLATURE. *Smilax* comes from a Greek word meaning *to scratch* because the whole plant bristles with thorns. German, *stechwinde*. English, *rough bindweed.* Italian, *rovo cervino*. Spanish, *esmilace*. Provençal, *gros-grame*.

The Mauritania green brier, *Smilax mauritanica,* Desf., is a plant with a woody stem that climbs on trees. The stems are prickly. The leaves are heart-shaped with three noticeable veins and with spines on the margins. The flowers are at the ends of the stems and are larger than those of the previous species.

FLOWERS: in July and August.

RANGE: Corsica, the Isles d'Hyères and the Barbary Coast.

USES. These two plants are only able to add variety

to collections in the north of France. They have no medical use.

CULTIVATION. They're propagated using seeds received from their native lands and planted in small pots as soon as they arrive. In the north of France they're very sensitive to cold. Consequently, those that are to be placed out in the open should be planted in light soil and most importantly in a favorable exposure.

KEY TO PLATES.

Provence green brier. 1. Fruiting female plant. 2. Male plant after flowering. 3. Complete fruit. Same, transverse section.

Mauretania green brier.

SPIREA.

Family: ROSACEAE.
Reproductive system: ICOSANDRY, PENTAGYNY.

The spireas are noteworthy for their pretty flowers and the variety of their foliage. One might say that they've totally borrowed the different shapes of their leaves from other plants.

The snow spirea, *Spiræa crenata,* Linn., grows about a meter high. It has woody stems and straight branches with oblong leaves that are entire at the base and toothed at the tip. The white flowers are pedunculate and are arranged in corymbs.

FLOWERS: in June and July.

RANGE: Siberia and the mountains of the Auvergne.

The willow-leaved spirea, *Spiræa salicifolia,* Linn., puts up several smooth, woody stems about two meters high. The leaves are lanceolate, finely toothed on the margins, and blunt at their tip. The red-violet flowers form dense terminal spikes.

FLOWERS: in July and August.

RANGE: North America; naturalized for several years in all our recreational gardens.

The germander spirea, *Spiræa chamedrifolia,* Linn., is a shrub with oval leaves, entire at their base and toothed at the tip. The white flowers are assembled in corymbs together with the leaves.

FLOWERS: at the beginning of spring.

RANGE: Siberia; grown in the open in ornamental gardens.

The snowball-bush-leaved spirea, *Spiræa opulifolia,* Linn., is a small tree three or four meters high with brown bark that is partially shed every year. The leaves are alternate with three or more toothed and pointed lobes.

The St. John's wort-leaved spirea, *Spiræa hypericifolia,*

is a spreading shrub full of very entire oval leaves. The white flowers, in umbels, are very numerous, axillary, and unilateral.

The hardhack spirea, *Spiræa tomentosa,* is a small tree with a straight trunk. The leaves are oval lanceolate, irregularly toothed, yellow green above and white underneath. The red flowers are in terminal clusters.

RANGE: Like the two previous ones, it originated in America. It's been naturalized in our gardens for a long time.

NOMENCLATURE. According to Pliny *Spiræa* comes from the Greek *spireon,* a name the ancients gave to a bush whose branches were used especially for making garlands.

USES. The spireas deserve cultivation as ornamentals in groves and large gardens. Their many flowers make a delightful sight. They can be used to make hedgerows and to beautify wild areas, especially next to a shoreline where they look lovely and do well.

CULTIVATION. These plants are very hardy and easy to grow. They're propagated from seeds, suckers, layers, and cuttings. Unless the soil is absolutely wretched, they're certain to grow quickly. It's a good idea to replace them after a few years because they become disfigured as they age.

KEY TO PLATES.

438. Snow spirea. 1. Calyx, stamens, and pistils.
439. Willow-leaved spirea. Flower, enlarged. 2. Calyx and stamens. 3. Pistils.
440. Germander spirea.
441. Snowball-bush-leaved spirea. 1. Calyx and capsules. 2. Complete flower.
442. Hardhack spirea. 1. Calyx and stamens. 2. Flower, enlarged.
443. St. John's wort-leaved spirea. 1. Calyx and stamens.

STAPHYLEA.

Family: BUCKTHORN FAMILY.[*Translator's note*: now Staphyleaceae.]
Reproductive system: PENTANDRY, TRIGYNY.

The European bladdernut tree, *Staphylea pinnata,* Linn., is a small tree that's been cultivated for a long time in our parks and gardens, where it grows to a height of fifteen to twenty feet. The stem is branchy and it forms a bush. It's covered with a streaked, whitish ash-colored bark. The leaves are pinnate and consist of five or seven oval oblong acuminate leaflets that are finely toothed on the margins. The white flowers are in pendent clusters. The calyx is colored; it has five deep divisions and a cup-shaped disc inside. The corolla is made up of five upright petals. Five stamens are set opposite the divisions in the calyx. The ovary is free and surmounted by three styles. The fruit is formed by three bladder-like capsules joined together from their middle to the base, but separate on their inner side toward the tip. They contain one or two osseous smooth seeds truncated at the base.

FLOWERS: in April, May, and June.

RANGE: Alsace and the Piedmont at higher elevations.

NOMENCLATURE. The ancient botanists called it *staphylodendron*, meaning *tree with clusters*, from which *staphylea* got its name. Colloquial French, *snub-nose, false pistachio tree, grape tree*. German, *die pimpernuss*. English, *the five-leaved bladder-nut*. Russian, *klekotchska*. Polish, *klokocina*. Hungarian, *halyag-fa*.

The three-leaved bladdernut tree, *Staphylea trifoliata,* Linn., is not as tall as the preceding one. The leaves are composed of three oval, pointed, toothed leaflets. The flowers are in long pendent white clusters. The calyx has five sections and the corolla five petals.

FLOWERS: in May and June.

RANGE: Virginia; naturalized in our gardens.

USES. A mild and resolutive oil is extracted from the seeds, but when eaten they have a very sharp taste. In former times nuns used them to make rosary beads. These two small trees can add variety in parks and they're already quite widespread.

CULTIVATION. They're propagated from their shoots, which are plentiful. Autumn is the best season to transplant them. They're very hardy and thrive in all sorts of soils and exposures.

KEY TO PLATES.

701. European bladdernut tree. 1. Complete flower. 2. Petals 3. Calyx, stamens and pistil. 4. Intact fruit. 5. Seed. 6. Same, transverse section.

702. Three-leaved bladdernut tree. 1. Complete flower. 2. Stamens and pistil. 3. Intact seed. 4. Same, transverse section.

SUMAC.

Family: TEREBINTH FAMILY. [*Translator's note*: now in Anacardiaceae]
Reproductive system: PENTANDRY, TRIGYNY.

The common smoke tree, *Rhus cotinus,* Linn., is a shrub seven or eight feet tall with smooth bark and yellow wood. The branches are twisted. They're full of leaves that are simple, rounded, ovoid, smooth, green above and whitish underneath. The flowers form panicles on the ends of the branches. The calyx has five sections, the corolla five petals, and there are five stamens. The ovary is free; it has three styles and turns into a drupe that contains a monospermous pit. The bare pedicels become very hairy after the flowers bloom, which gives the panicles a feathery appearance.

FLOWERS: in July and August.

RANGE: hillsides in the southern provinces, at Grenoble and Les Baux near Gap.

NOMENCLATURE. *Cotinus* is the name that Pliny used to describe a tree in the Apennines. German, *fustet, fustel*. English, *the venu's sumach*. Italian, *cottino, rossolo*. Russian, *scheltoe derewzo*. Tatar, *belge, welgy*.

The staghorn sumac, *Rhus typhinum,* Linn. is a large shrub distinguished by beautiful panicles of purple flowers. The leaves are pinnate with seven or nine pairs of oblong pointed leaflets. They have sharp teeth on their margins, are whitish underneath, and are suspended on hairy petioles. The branches likewise are covered with reddish hair that's soft to the touch.

FLOWERS: in July.

RANGE: North America; they're quite widespread in our parks and gardens.

USES. The smoke tree, with its display of silky yellow panicles often tinged with purple, is excellent for decorating parks and gardens. When they're crumpled the leaves emit a scent of lemon. The wood and bark yield a reddish or yellow pigment that can be used to dye fabrics. The staghorn sumac equally contributes to embellishing parks and gardens with its elegant foliage and its berries clustered in panicles at the ends of its branches.

CULTIVATION. These trees succeed in all kinds of terrain, but they prefer good quality light soil. They have to be sheltered from strong winds that damage and break them. They're propagated from seeds and suckers; once they're in hand, you won't run short of them because they propagate and spread far and wide via their shoots.

KEY TO PLATES.

Common smoke tree. 1. Intact drupe with the calyx at its base. 2. Same, transverse section.

Staghorn sumac. 1. Intact drupe. 2. Same, transverse section to show the seed. 3. Detached seed.

MOCK ORANGE.

Family: MYRTACEAE.[*Translator's note*: now in family Saxifragaceae]
Reproductive system: ICOSANDRY, MONOGYNY.

The sweet mock orange, *Philadelphus coronarius,* LINN., originally from southern France, now has spread over almost all of Europe. Its stem, brown or reddish in color, rises four, five, and ten feet high. It bears a large number of slightly crooked branches. The leaves are opposite, oval-lanceolate, with lightly dentate margins; they have a soft consistency and are strongly marked with veins. The white flowers are arranged in small bunches of five or six at the ends of the branches. The calyx is top-shaped and has four or five sections. The corolla is made up of four or five petals. The stamens, numbering about twenty, are inserted into the calyx. The ovary is adherent and is crowned by a stigma that's split into four sections. The fruit is a capsule with four compartments that contain many seeds.

FLOWERS: in June and July.

RANGE: France and southern Europe. It's been observed in Piedmont by Allioni and in Dauphiné by Villars [*Translator's note:* Carlo Allioni, 1728-1804, was a physician, botanist, and taxonomist in Turin; Dominic Villars, 1745-1814, a French botanist and taxonomist.]

NOMENCLATURE. The genus name *Philadelphus,* or brotherly love in Greek, was the name of one of the Ptolemies, a king of Egypt, to whom the genus was dedicated [*Translator's note*: it was named for Ptolemy II, Ptolemy Philadelphus, ca. 308-246 B.C.E., probably by Athenaeus, an Egyptian-born Greek writer and botanist]. German, *der pfeifenstrauch, wilder jasmin*. Dutch, *wite syring*. English, *mock-orange, the pipe-tree*. Spanish, *geringuilla*. Russian, *tschubuschnik, pustoryl*.

USES. This shrub has been able to contribute to the decoration of groves and gardens for a long time. The aroma of its flowers is most pleasant but rather strong. Some people find that bothersome.

CULTIVATION. There are two cultivated varieties. One has odorless, semi-double flowers; the other, smaller in all of its parts, grows only two or three feet high. The mock orange isn't delicate; it thrives in all kinds of soil and in all exposures. It's propagated from shoots or by dividing the plants in autumn. It rarely succumbs while being transplanted.

KEY TO PLATE.

1. Sweet mock orange. 2. Calyx and pistil. 3. Longitudinal section of flower to show insertion of stamens and petals. 4. Fruit.

TAMARISK.

Family: PORTULACACEAE [*Translator's note*: now in family Tamaricaceae.]
Reproductive system: PENTANDRY, TRIGYNY.

The elegant foliage and wavy branches of the French tamarisk, *Tamarix gallica,* LINN., give it a picturesque appearance. From a distance it could be taken for a cypress or a savin, but its pretty flower spikes clearly distinguish it. The stem reaches a height of three or four meters; it has slender, wavy, reddish branches. The leaves are tiny, short, pointed, and imbricate. They look a lot like cypress leaves. The purple-white flowers emerge on small slender spikes set alternately at the ends of the branches. The calyx has five very deep divisions. The corolla has five petals that are larger than the sections of the calyx. There are five stamens. The ovary terminates in three oblong stigmata. The fruit is a capsule with three polyspermous valves.

FLOWERS: from May until October.

RANGE: southern France.

NOMENCLATURE. German, *franzœsische tamarisken.* English, *the french tamarisk.* Spanish, *taray, talaya.* Russian, *grebenschik.* Commonly, *tamarisk of Narbonne*.

USES. The roots and the bark of this shrub are used to treat dropsy and obstructions of the liver, spleen, and other vital organs. They're used as ingredients in laxative infusions and in decoctions. An extract of the bark prepared with white wine or brandy is also a potent laxative when given at a dose of one or two drams.

Dyers sometimes use the fruit instead of nutgall for a black dye. The wood is used to make small furniture pieces, cups, goblets, etc.

A special kind of salt similar to sodium sulfate is extracted from ashes of its roots.

CULTIVATION. This plant originated in southern France and can't tolerate the severe cold of the northern provinces. The stems and branches sometimes die, although they grow again from the base of the plant. The plant is propagated in February from cuttings placed in fresh, gentle, good quality soil. They'll take root the same year, but they should be transplanted only at the end of the following year or in the spring of the year after that. It grows naturally in cool damp places and requires a generally similar location in our gardens.

KEY TO PLATE.

1. French tamarisk. 2. Calyx, enlarged. 3. Complete flower, greatly enlarged. 4. Pistil.

BLACK BRYONY.

Family: SMILACEAE. [*Translator's note*: now in family Discoreaceae.]
Reproductive system: DIOECY, HEXANDRY.

The black bryony, *Tamus communis,* LINN., is a very common plant in woodlands around Paris. The stems are smooth, frail, and four or five feet high. They twine around adjoining plants. The leaves are alternate, heart-shaped, pointed, and veined. They have a soft consistency and their petioles have two small stipules at the base. The male flowers and female flowers are on separate plants. The small, yellowish male flowers are in loose, axillary clusters. Their calyx is bell-shaped, divided into six parts at the top, and encloses six stamens. The female flowers have an adherent ovary, a single style, and three stigmata; the fruit is a berry with three compartments.

FLOWERS: from May until August.

RANGE: woodlands and hedges in a large part of France.

NOMENCLATURE. German, *schwarzwurzel, schmeerwurz*. Dutch, *vrouwenzegel, wilde of zwarte bryonie*. English, *the common tamus, or black bryony*. Italian, *brionia neyra*. Portuguese, *norça preta*. Commonly, *the Our Lady's seal, Virgin's root, battered wife's root*.

USES. The root is very big. It's used in the veterinary arts. In medicine it's considered to be a resolutive and a vulnerary. It's scraped and crushed and applied as a poultice on the injured areas of contusions and bruises. It's a component in several medications.

CULTIVATION. This plant is cultivated only in botanical and pharmaceutical institutes. In a garden

it can help fill out an arbor. It will form a spindle-shaped pyramid on its own if care is taken to keep it separate and to provide it with a pole for support.

KEY TO PLATE.

1. Black bryony. 2. Leaf, natural size. 3. Open male flower.

TRUMPETBUSH.

Family: BIGNONIACEAE.
Reproductive system: DIDYNAMY, ANGIOSPERMY.

Botanists generally advance the field of science that they study, and society only appreciates them in this regard. Yet it derives an immediate, special, and unmistakable benefit from the abundance and variety of plants from abroad that have been acclimatized in our gardens and parks for a number of years. For about a hundred years the trumpetbush, *Bignonia radicans,* LINN., or trumpet creeper, was known in Europe only from descriptions of occasional travelers. Nowadays it covers the walls of our dwellings. Every year it blooms and often yields fruit as it does in its native land. The stems that climb like ivy grow as high as thirty or forty feet. They're smooth and branchy. The leaves are opposite, pinnate, and consist of seven, nine, or eleven oval pointed serrate leaflets that have a beautiful green color. The scarlet flowers are very large and are set in very short bunches at the ends of the branches. The calyx is a single cup-shaped unit with five teeth at its top. The monopetalous corolla is a long tube that's wide open at the top and terminates in five lobes of unequal size. The four stamens are inserted near the base of the corolla where the rudiment of a fifth stamen can be seen. The ovary is free. It's surmounted by a long style and terminates in a stigma with two lobes. The fruit is a capsule shaped like a long cylindrical siliqua with two valves and a partition opposite them. It contains a number of seeds with membranous edges.

FLOWERS: in July and August.

RANGE: North America; naturalized in our gardens for several years.

NOMENCLATURE. German, *die wurzelnde trompetemblume*. English, *the climbing trumpet flower*. Dutch, *wortelende bignonia*.

USES. For a long time this plant has been used to cover walls and to create arbors which are adorned by its beautiful flowers for several months during the summer.

CULTIVATION. It's easily propagated by layering the branches or from shoots that regularly grow out of it. While the plant is young it's a good idea to cover the stem with straw during severe cold, especially in the north of France.

KEY TO PLATE.

1. Trumpetbush. 2. Calyx and pistil. 3. Stamens and base of the corolla.

THYME.

Family: LABIATAE.
Reproductive system: DIDYNAMY, GYMNOSPERMY.

Common thyme, *Thymus vulgaris,* Linn., is a small woody plant well known for its strong aromatic fragrance. Its reddish brown stems are slightly hairy, very branchy, and grow two or three inches high. The leaves are small, whitish, entire, and green above. The reddish flowers are in whorled spikes at the ends of the branches. The calyx has two lips and is closed by hairs. The upper lip has three teeth; the lower one has two that are narrower and more pointed. The corolla likewise has two lips. The upper one is indented and the lower one has three entire lobes. The four stamens are hidden inside the tube of the corolla. The ovary has four lobes that turn into the same number of small monospermous capsules.

FLOWERS: in May and June.

RANGE: hillsides in the southern provinces of France.

NOMENCLATURE. *Thymus* comes from a Greek word that means strength or courage because its balsamic aroma arouses and strengthens sexual desire. In our southern dialect it's called *frigoulo* or *faligoulo*. German, *thymian, thumel*. English, *the garden thyme*. Spanish, *tomillo*. Russian, *fimiane*. Hungarian, *balsam-fü*.

Wild thyme, *Thymus serpillum,* Linn., is a small plant with a hard, woody stem that lies close to the ground. The leaves are small, opposite, entire, flat, and ciliate at the base. The flowers are arranged in oblong heads at the ends of the branches. They're purplish, sometimes white. The calyx has two lips; the teeth on the lower lip are pointed and ciliate. The corolla likewise has two lips and has four stamens in its tube. The ovary has four lobes that turn into the same number of monospermous capsules.

FLOWERS: in June, July, and August.

RANGE: roadsides and arid hills.

USES. These two plants are used in kitchens to season sauces and ragouts. In medicine they're regarded as cephalics, expectorants, aperients, and emmenagogues. The parts that are used are the flowering tips taken as an infusion like tea. These two species of thyme impart an excellent flavor to the meat of sheep that graze on them.

CULTIVATION. They're propagated in March by dividing the clumps and lightly watering them until they take root. They have to have warm loose soil, not too heavy, and a southern exposure.

KEY TO PLATES.

699. Common thyme. 1. Leaf, greatly enlarged. 2. Intact calyx, enlarged. 3. Open corolla and stamens. 4. Open calyx and pistil, enlarged.

700. Wild thyme. 1. Open calyx and pistil. 2. Open corolla. 3. Intact calyx, enlarged.

PRIVET.

Family: JASMINE FAMILY.[*Translator's note*: now in family Oleaceae.]
Reproductive system: DIANDRY, MONOGYNY.

The common privet, *Ligustrum vulgare,* Linn., is a bushy shrub that grows six to eight feet high. The bark on its stem is ash-colored. The leaves are opposite, oval-lanceolate, entire, glabrous, smooth, and suspended on short petioles. The white flowers are positioned at the ends of the branches in paniculate clusters. The calyx is entire, with four small teeth. The corolla is monopetalous, with four lobes that have a short limb. Two stamens are inserted at the base of the corolla. The ovary is free and surmounted with a style and a thick, bifid stigma. It turns into a berry with two compartments that have two or four seeds.

FLOWERS: in June and July.

RANGE: France and Europe.

NOMENCLATURE. According to Vossius [*Translator's note*: probably Gerhard Vossius, 1577-1649, professor of Greek and philosophy in Holland and a writer on natural history], *Ligustrum* is derived from *ligare,* to bind up, because its long and supple branches are used for this purpose. German, *liguster, rainweide*. Dutch, *rynwilg*. English, *privet, prim*. Italian, *rovistico*. Spanish, *alhena*. Russian, *schost*. Polish, *ptasza zob*. Hungarian, *fagyal-fa*. Colloquial French, *fresillon, truffier*.

USES. This shrub is used to form hedges. Mixed with hawthorn and hornbeam, it intertwines with them and fulfils its purpose well. Its beautiful white flowers make an attractive sight in groves of greenery. The leaves fall off only after the first frost.

The fruit turns black when it ripens. Thrushes and blackbirds relish them. A bluish pigment, not especially valued, is prepared from it in the north as well as in Paris. Wine merchants use it to add color to wines that are pale and weakly colored.

The leaves have a bitter taste. They're believed to be astringent and effective for treating aphthae and ulcerations of the mouth, but they're not used in medicine.

CULTIVATION. This shrub is propagated from seeds, cuttings, and layers. It thrives in all kinds of soil and in all exposures.

KEY TO PLATE.

Common privet. 1. Calyx and pistil. 2. Open corolla and stamens. 3. Panicle of ripe fruit. 4. Detached berry, transverse section. 5. Seed.

BARBERRY.

Family: BERBERIDACEAE.
Reproductive system: HEXANDRY, MONOGYNY.

The common barberry, *Berberis vulgaris,* LINN., is planted in groves and in ornamental gardens. It's also used to make protective hedges. The fruit, tart and refreshing, is preserved with sugar. The stem is upright, branchy, and covered with gray bark. The leaves have very sharp ternate spines where they insert into the stem. Grouped in clusters, they're alternate, oval, narrow at the base, bright green, and finely denticulated on the margins. The yellow flowers are arranged in pendent axillary clusters. The calyx has six rounded leaflets that have three bracts on the outer side of their base. The corolla has six petals that have two glands on the inner side of their base. The six stamens terminate in anthers that open from bottom to top. They're unusually sensitive and fold back onto the pistil when touched with the point of a pin. The ovary is free; it's topped by a wide sessile persistent stigma.

VARIETIES.

There are several known varieties of this species: 1st, one with fruit that has no pit. 2nd, one with white fruit. 3rd, one with purple fruit. 4th, Allegheny barberry. 5th, barberry from China.

FLOWERS: in April and May.

RANGE: hedgerows in France and in a part of Europe.

NOMENCLATURE. German, *der sauerdorn, saurach*. English, *the berberry*. Spanish, *espino*. Russian, *barbariss*. Polish, *ciernie biale*. Hungarian, *leany-som*. Commonly, *l'épine-vinette*.

USES. The bark of this shrub sometimes is used in decoctions for diarrhea and dysentery, but it's the fruit that's used more frequently. A handful is added to each pint of infusion. Some doctors prescribe a wine made with the fruit for heavy menstrual bleeding. A syrup made from it also is used in a gargle for sore throats.

KEY TO PLATE.

1. Common barberry. 2. Calyx seen from below. 3. Detached petal with two glands at the base. 4. Stamens and pistil. 5. Stamen enlarged to show how the anthers open. 6. Fruit.

VIBURNUM.

Family: CAPRIFOLIACEAE.
Reproductive system: PENTANDRY, TRIGYNY.

A variety of this shrub, the European cranberry bush, *Viburnum opulus,* LINN., is cultivated in gardens almost everywhere. Its flowers are very large, sterile, and cluster in a ball. It goes by the names of guelder rose, snowball, etc. The numerous flowers, dazzlingly white, create a superb sight in large parterres in early spring.

The European cranberry bush grows five or six feet high. The stem is smooth, cylindrical, and branchy. The leaves are smooth, opposite, and petiolate. They have three pointed lobes and are unevenly toothed on the margins. The flowers are white, terminal, and form umbels. The peripheral ones are much larger than the rest, irregular, and usually are sterile. The calyx has five short lobes and has a bract at its base. The corolla is bell-shaped with five lobes. The five stamens, longer than the lobes of the corolla, alternate with them. The ovary adheres to the calyx; it's crowned with three stigmata. The fruit is an elliptical, monospermous red berry. The seed is hard, flattened, and heart-shaped.

FLOWERS: in May and June.

RANGE: France and a large part of Europe.

NOMENCLATURE. German, *der schneeballen, bachholde*. English, *the water-elder*. Dutch, *watervlier*. Italian, *oppio*. Russian, *kalina dikaia, kalinik*. Hungarian, *kanya-fa*. Armenian, *alaschoari*.

USES. The snowball bush should be used to ornament springtime gardens and the European cranberry bush for the autumn ones,

because their striking red fruit remains until the end of that season. It's also a good idea to place them in coverts to attract birds that are fond of the fruit.

CULTIVATION. This shrub isn't fastidious about the type of soil that it's in. It's propagated from seeds but more often from layers or from rooted suckers that adjoin the larger plants.

KEY TO PLATE.

1. European cranberry bush. 2. Peripheral flower. 3. Central flower opened and stamens. 4. Calyx and pistil, enlarged.

VIBURNUM.

Family: CAPRIFOLIACEAE.
Reproductive system: PENTANDRY, TRIGYNY.

The laurustinus, *Viburnum tinus,* Linn., is a small shrub in Paris gardens, but in Provence it grows more than thirty feet tall when it's grown in good soil. The young shoots are squared and reddish. The leaves are oval, pointed, firm, and persistent. They're dark green above and slightly downy on the veins underneath. Once they open, the flowers form beautiful white clusters, but the flower buds are reddish. The calyx has five short lobes. The bell-shaped corolla has five lobes. It bears five stamens that alternate with the lobes. The ovary is adherent; it turns into a monospermous berry crowned by the teeth of the calyx.

FLOWERS: in April in Provence.

RANGE: stony ground and shaded areas in Provence.

NOMENCLATURE. According to Séb. Vaillant [*Translator's note:* Sébastien Vaillant, 1669-1722, was a French botanist. He studied in Paris under Tournefort], *Tinus* comes from a Greek word meaning small, dwarf, because its stem isn't very tall. Pliny describes a tree by this name that he says is considered by some to be a wild laurel and that others believe belongs to a different genus. German, *der laurustinus, wilder lorbeer*. Dutch, *laurustinus*. English, *the laurestine*. Italian, *alloro salvatico*. Spanish, *durillo*. Portuguese, *folhada, tinilho bastardo*.

USES. This shrub has been used for a long time to adorn parterres and even as a house plant. During the winter it's often covered with flowers in corymbs that are red on the outside and white on the inside.

CULTIVATION. The shrub is propagated by layering, grafting, and even from seeds. Around Paris it's vulnerable to severe frost,

and its base has to be protected with straw when it's in open ground. In the southern provinces there's no need for these precautions when it's kept in a garden. In Paris it's more usually grown in a pot or in a tub. The flowers thus can be enjoyed indoors by placing it near a window to give it air as long as it doesn't freeze. It doesn't like a lot of water and it could die if watered heavily, even during the summer. It's not fastidious about the type of soil that it's in, but in our region it does much better if it has a southern exposure.

KEY TO PLATE.

Laurustinus. 1. Complete flower, enlarged. 2. Corolla and stamens. 3. Calyx and pistil.